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OF

THE LINNEAN SOCIETY OF LONDON.

SECOND SERIES—VOLUME XVIII.

ZOOLOGY.

THE PERCY SLADEN TRUST EXPEDITION

TO

THE INDIAN OCEAN IN 1905,

UNDER THE LEADERSHIP OF

MR J. STANLEY GARDINER, M.A.

VOLUME VII.

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REPORTS

OF THE

PERCY SLADEN TRUST EXPEDITION

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VOLUME THE SEVENTH

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No. I.—REPORT ON THE SIGMATOTETRAXONIDA COLLECTED BY H.M.S. "SEALARK" IN THE INDIAN OCEAN.

By Arthur Dendy, D.Sc., F.R.S., F.L.S., *Professor of Zoology in the University of London (King's College).*

(Plates **1**—**18**.)

The scope of the sub-order Sigmatotetraxonida is here greatly enlarged by the inclusion therein of the Lithistidæ and Clavulidæ, and the group as now constituted is by far the largest of the tetraxonid sub-orders, being represented in the "Sealark" collection by no less than 126 species. Of this total 57 species are here described as new, 65 are identified with previously known species (in some cases as new varieties) and 4 are identified generically only.

The importance of the collection is indicated even more clearly by the fact that it has seemed desirable to propose six new genera for the reception of species represented therein. Of these, Colloclathria is of special interest on account of the occurrence of gelatinous spicules (colloscleres) similar to those of the recently proposed genus Collosclerophora Dendy [1916 E]; Barbozia, Didiscus and Sigmosceptrella are of great importance from the taxonomic point of view, throwing much light upon the origin of the Spirastrellinæ and necessitating the transference of the Clavulidæ from the astrotetraxonid to the sigmatotetraxonid series, while the peculiar discorhabd of Didiscus has suggested some novel ideas with regard to spicule-formation [Dendy and Nicholson, 1917].

In addition to many novelties the collection also contains representatives of such rare and interesting genera as Merlia (represented only by single spicules), Forcepia, Tedanione, Cornulum, Sideroderma*, Cyamon, Halicnemia, Acanthoxifer, Hemiasterella, Trichostemma, &c., and adds very greatly to our knowledge of the group as a whole.

The following is a complete list of the species dealt with in the present contribution:—

Order TETRAXONIDA.

Sub-order Sigmatotetraxonida.

Family **Lithistidæ**.

1. *Theonella pulchrifolia* n. sp.
2. *Discodermia tuberosa* n. sp.
3. *Taprobane herdmani* Dendy.
4. *Petromica massalis* Dendy.

Family **Tetillidæ**.

5. *Tetilla furcifer* n. sp.
6. *Cinachyra vaccinata* n. sp.
7. *Cinachyra isis* Lendenfeld.
8. *Cinachyra providentiæ*, n. sp.
9. *Cinachyra anomala* (Dendy).
10*a*. *Paratetilla bacca* (Selenka) var. *violacea* (Kieschnick).
10*b*. *Paratetilla bacca* var. *corrugata* nov.

* Name replaced in this Report by *Siderodermella* (*q. v.*).

Family **Haplosclerida**.

Sub-family **Gelliinæ**.

11. *Gellius fibulatus* (Schmidt) var. *microsigma* Dendy.
12. *Gellius flagellifer* Ridley and Dendy.
13. *Gellius calyx* Ridley and Dendy var. *indica* nov.
14. *Gellius toxius* Topsent.
15. *Gellius petrosioides* (Dendy).
16. *Gelliodes carnosa* Dendy var. *laxa* nov.
17. *Toxochalina robusta* Ridley.

Sub-family **Renierinæ**.

18. *Reniera semitubulosa* (Lamarck?).
19. *Reniera rosea* (Bowerbank).
20. *Reniera cribriformis* Ridley.
21. *Reniera camerata* Ridley.
22. *Reniera cribricutis* n. sp.
23. *Reniera tuberosa* n. sp.
24. *Reniera tufoides* n. sp.
25. *Reniera ligniformis* n. sp.
26. *Petrosia seychellensis* n. sp.
27. *Petrosia mammiformis* n. sp.
28. *Halichondria panicea* Johnston var.
29. *Halichondria retiderma* n. sp.
30. *Halichondria nigra* n. sp.
31. *Halichondria aplysinoides* n. sp.
32. *Halichondria tenuiramosa* nom. n.

Sub-family **Chalininæ**.

33. *Pachychalina subcylindrica* Dendy.
34. *Chalina confusa* n. sp.
35. *Ceraochalina reticutis* Dendy var. *salomonensis* nov.
36. *Ceraochalina differentiata* n. sp.

Sub-family **Phlœodictyinæ**.

37. *Oceanapia toxophila* n. sp.
38. *Phlœodictyon seychellense* n. sp.
39. *Phlœodictyon porosum* n. sp.
40. *Phlœodictyon fistulosum* (Bowerbank).
41. *Phlœodictyon incrustatum* n. sp.
42. *Phlœodictyon polysiphonia* n. sp.

Sub-family **Merliinæ**.

43. *Merlia* sp.

Family **Desmacidonidæ**.

Sub-family **Esperellinæ**.

Section Mycaleæ.

44. *Mycale crassissima* (Dendy).
45. *Biemna tubulata* (Dendy).
46. *Paresperella* sp.

Section Cladorhizeæ.

47. *Amphilectus* (?) *unguiculatus* n. sp.

Sub-family **Ectyoninæ**.

Section Clathrieæ.

48. *Microciona atrasanguinea* Bowerbank.
49. *Microciona strepsitoxa* Hope var. *robusta* nov.
50. *Aulospongus tubulatus* (Bowerbank).
51. *Bubaris conulifera* n. sp.
52. *Bubaris salomonensis* n. sp.
53. *Clathria procera* (Ridley).
54. *Clathria corallitincta* Dendy.
55. *Clathria spicata* Hallmann.
56. *Clathria whiteleggii* n. sp.
57. *Clathria madrepora* n. sp.
58. *Clathria spongodes* n. sp.
59. *Clathria chelifera* (Hentschel).
60. *Echinoclathria intermedia* Whitelegge.
61. *Raspailia* sp.
62. *Ectyon ceylonica* (Dendy).
63. *Echinodictyum clathratum* Dendy.

Section Collosclerophoreæ.

64. *Colloclathria ramosa* n. gen. et sp.

Section Plocamieæ.

65. *Plocamia coriacea* (Bowerbank).
66. *Plocamia elegans* (Ridley and Dendy).
67. *Plocamia massalis* n. sp.
68. *Lithoplocamia lithistoides* n. gen. et sp.

Section Hymedesmieæ.

69. *Hymedesmia lævissima* n. sp.
70. *Hymedesmia lipochela* n. sp.
71. *Hymeraphia radiata* (Bowerbank).
72. *Rhabderemia pusilla* (Carter).

Section Myxilleæ.

73. *Plumohalichondria clathrodes* n. sp.
74. *Plumohalichondria gardineri* n. sp.
75. *Myxilla incrustans* (Johnston).
76. *Myxilla arenaria* Dendy.
77. *Hamigera papillata* n. sp.
78. *Forcepia stephensi* n. sp.
79. *Forcepia* (?) sp.

Section Crelleæ.

80. *Yvesia spinulata* (Hentschel).
81. *Crella cyathophora* (Carter) var. *acuata* nov.

Section Iotrochoteæ.

82. *Iotrochota purpurea* (Bowerbank).
83. *Iotrochota baculifera* Ridley.

Section Acarneæ.

84. *Acarnus topsenti* n. sp.

Section Tedanieæ.

85. *Tedania digitata* (Schmidt).
86. *Tedania reticulata* Thiele.
87. *Tedanione wilsoni* n. sp.

Section Cœlosphæreæ.

88. *Cornulella lundbecki* n. gen. et sp.
89. *Cornulum strepsichela* n. sp.
90. *Siderodermella ramosa* n. sp.

Section Cyamoneæ.

91. *Cyamon vickersii* (Bowerbank).

Sub-family **Axinellinæ**.

Section Axinelleæ.

92. *Sigmaxinella bihamigera* n. sp.
93*a*. *Sigmaxinella durissima* (Dendy) var. *massalis* nov.
93*b*. *Sigmaxinella durissima* (Dendy) var. *erecta* nov.
93*c*. *Sigmaxinella durissima* (Dendy) var. *tethyoides* nov.
94. *Axinella bubarinoides* n. sp.
95. *Axinella spiculifera* (Lamarck).
96. *Phakellia donnani* (Bowerbank).
97. *Phakellia conulosa* n. sp.
97*a*. *Phakellia conulosa* var. *mauritiana* nov.
98. *Acanthella carteri* Dendy.
99. *Acanthella pulcherrima* Ridley and Dendy var. *calyx* nov.
100. *Acanthella cavernosa* n. sp.
101. *Auletta elongata* Dendy.
102. *Auletta lyrata* (Esper) var. *brevispiculata* Dendy.
103. *Hymeniacidon variospiculata* n. sp.
104. *Hymeniacidon conglomerata* n. sp.
105. *Leucophlœus fenestratus* Ridley.
106. *Spongosorites salomonensis* n. sp.

Section Heteroxyeæ.

107. *Higginsia petrosioides* n. sp.
108. *Higginsia higgini* n. sp.
109. *Halicnemia salomonensis* n. sp.
110. *Acanthoxifer ceylonensis* Dendy.

Family **Clavulidæ**.

Sub-family **Spirastrellinæ**.

111. *Barbozia primitiva* n. gen. et sp.
111*a*. *Barbozia primitiva* var. *digitata* nov.
112. *Didiscus placospongioides* n. gen. et sp.
113. *Sigmosceptrella quadrilobata* n. gen. et sp.
114. *Spirastrella vagabunda* Ridley.
114*a*. *Spirastrella vagabunda* Ridley var. *tubulodigitata* Dendy.
114*b*. *Spirastrella vagabunda* Ridley var. *gelatinosa* nov.
115. *Spirastrella decumbens* Ridley.
116. *Spirastrella globularis* n. sp.
117. *Timea stellivarians* (Carter).
118. *Timea unistellata* (Topsent).
119. *Placospongia carinata* (Bowerbank).
120. *Hemiasterella intermedia* n. sp.

Sub-family **Clioninæ**.

121. *Cliona celata* Grant.

Sub-family **Suberitinæ**.

122. *Suberites cruciatus* Dendy var. *depressa* nov.
123. *Terpios fugax* Duchassaing and Michelotti.
124. *Polymastia tubulifera* n. sp.
125. *Polymastia conigera* Bowerbank.
126. *Trichostemma sarsii* Ridley and Dendy.

I have again to acknowledge my indebtedness to Miss Hilda L. Deakin, B.Sc., for valuable help, chiefly in making microscopical preparations and drawings, and to the Trustees of the Percy Sladen Fund for the financial assistance by which such help was rendered possible. The photographic illustrations are mainly the work of my skilled assistant, Mr Charles Biddolph.

As this part completes the account of the "Sealark" Tetraxonida, I propose to give at the end the reference list of literature applicable to the order.

Sub-order 3. Sigmatotetraxonida Hentschel [1909].

Tetraxonida with sigmatose microscleres or derivatives thereof (except when these have been lost secondarily). No true asters are present but pseudasters sometimes occur*.

Family **Lithistidæ**.

Sigmatotetraxonida in which the skeleton is composed chiefly of desmas, typically united in a continuous framework, so that the sponge often acquires a stony hardness.

I assign to the Lithistidæ a place amongst the Sigmatotetraxonida on account of the fact that they sometimes contain sigmatose microscleres but, so far as I am aware, never true asters. As there are very few species in the collection it is undesirable to enter into the question of the subdivision of the family (hitherto usually regarded as an order) except as regards the genera and species represented.

Genus Theonella Gray [1868].

Lithistidæ with tetracrepid desmas, phyllotriænes or (and) dichotriænes (typically dermal) and microrhabds; without discotriænes.

* For a discussion as to the origin of these see under Cyamoneæ and Spirastrellinæ; also Dendy [1921].

1. *Theonella pulchrifolia* n. sp.

(Plate **9**, fig. 1 *a—m*.)

This species is unfortunately represented only by a number of broken fragments. These have the form of irregular, flattened plates, which may be strongly curved. They are about 3 mm. thick and the largest piece measures 15 by 10 mm.; there is another of about the same size and four or five smaller bits. Probably all belong to the same specimen. Oscula and pores not made out. Texture hard and stony, but friable. Colour in spirit white.

The main skeleton is a close reticulation of tetracrepid desmas, united together by interlocking of the much-branched rays. The reticulation may become much closer at the surface. There is possibly a dermal skeleton of phyllotriænes, but, although these spicules are abundant in boiled-out preparations, I have rarely, if ever, seen one in position at the surface.

Spicules:—(1) Desmas (Plate **9**, figs. 1 *a—e*); these are very irregular and have their rays much branched, especially towards the extremities, the ultimate branches being short and crowded and constituting the interlocking processes. The mode of interlocking is shown at *xx* in fig. 1 *b*. They are typically tetracrepid (fig. 1 *a*) but deviations from the type occur, as shown in the figures. The more central portions of the rays are usually nearly smooth, but at the surface of the sponge the outer aspects of the rays are more or less abundantly ornamented with large blunt tubercles (fig. 1 *b*). Maximum diameter of desma, say, about 0·34 mm.

(2) Phyllotriænes (fig. 1 *f—m*); very irregular, with short shaft and usually much-branched, smooth, foliaceous rays; the terminal portions of the branches often appear to be reduced to thin, flat films of silica; maximum diameter of cladome, say, about 0·14 mm. A peculiar feature of these spicules is the enormous enlargement of the axial canal in the shaft and in the basal portions of the cladi, perhaps due to erosion. This may be carried to such an extent that the shaft and cladi may be almost separated from one another. This feature is well shown in the illustrations (see especially fig. 1 *l*, *m*).

(3) Dichotriænes (fig. 1 *n*); with short shaft and smooth, sharp-pointed, bifurcate rays; total diameter of cladome about 0·12 mm. Like the phyllotriænes, these spicules are abundant in boiled-out preparations, but I have failed to find them in position in the sponge.

(4) Long, slender, smooth microxea (fig. 1 *o*); fusiform, gradually and finely pointed at each end, often more or less angulate in the middle; size about 0·14 by 0·003 mm.

(5) Comparatively short, smooth or very minutely roughened microxea (fig. 1 *p*); straight or nearly so, fusiform, sharply pointed at each end; size about 0·057 by 0·0027 mm.

Owing to the unsatisfactory condition of the specimens it is quite possible that some elements of the spiculation may have been overlooked, but I do not think that this is very probable. It is also possible that the microxea, which occur chiefly, if not exclusively, in boiled-out preparations, may be foreign, but again I do not think so. The long slender ones resemble the corresponding spicules of *Discodermia tuberosa*, though perhaps of larger average size, but the short, often minutely roughened ones, are quite different from the short, roughened microrhabds of that species.

Register Number, Locality, &c. CXXIII. 1, Salomon, C., 3.7.05, 120—150 fathoms.

Genus Discodermia Barboza du Bocage [1869].

Lithistidæ with tetracrepid desmas and a dermal skeleton composed of discotriænes, to which phyllotriænes may be added; microscleres in the form of microrhabds.

2. *Discodermia tuberosa* n. sp.

(Plate **9**, fig. 2 *a—g*.)

Sponge massive, irregular, tuberous. There is no evidence of any definite attachment except in one specimen (R.N. IX. 2 A), which has a quantity of calcareous débris partly embedded in what was evidently the lower end of the slightly elongated sponge. The surface is uneven, but clean and fairly smooth, though harsh to the touch. Vents, in two cases at any rate, minute and grouped abundantly on the upper part of the sponge; now mostly closed by a thin, translucent membrane, presumably a sphincter. One of the specimens (R.N. IX. 2 C) shows a longitudinal folding of the whole sponge, which, if carried far enough, would enclose the group of vents in a cup-shaped depression. The surface of the sponge shows narrow subdermal canals, mostly running upwards towards the group of vents but sometimes ramifying irregularly. The texture is hard, compact and incompressible. The largest specimen measures about 25 mm. in maximum diameter. The colour in spirit is pale yellowish.

The skeleton is a close-meshed reticulation of much-branched tetracrepid desmas, with a dermal layer of discotriænes.

Spicules:—(1) Tetracrepid desmas (Plate **9**, fig. 2 *a*); with very irregularly and much-branched rays. Adjacent desmas never seem to be fused with one another, but held together simply by interlocking of their terminal ramifications. A single desma measures, say, about 0·7 mm. in maximum diameter, from apex to apex of opposite branches.

(2) Discotriænes (fig. 2 *b—d*); with a smooth, flat disc, commonly having an irregularly sinuous margin, and short, stout, subconical shaft. Diameter of disc up to about 0·5 mm.; length of shaft about 0·1 mm. The form of the young spicule, in which the cladi have not yet united to form the disc, is shown in fig. 2 *e*, which shows that all the rays at this stage have roughened surfaces.

(3) Microxea (fig. 2 *f*); slender, slightly curved or even angulate in the middle, gradually and finely pointed at each end, surface very minutely roughened; size about 0·09 by 0·0027 mm. Very abundant throughout the sponge.

(4) Microstrongyla (fig. 2 *g*); short, straight, sausage-shaped, with finely roughened surface; size about 0·0164 by 0·0027 mm. These spicules are extremely numerous just beneath the dermal layer of discotriænes; they also occur in much smaller numbers along with the microxea in the deeper parts of the sponge.

There seem to be no transitional forms between (3) and (4).

I have found no other spicules that can safely be regarded as really belonging to the sponge. Mounted preparations usually contain a larger or smaller number of fragments of long, slender megascleres, but some of these are certainly foreign inclusions. If any of them are proper to the sponge they are very local and sporadic in their distribution and I have never been able to find a complete one that does not appear to be foreign. R.N. IX. 2 C,

however, contains some bundles of irregularly ended, slender styli (?) which may perhaps form part of the proper spiculation. On the other hand, all the specimens contain a small number of large calthrops, which have quite evidently been derived from specimens of *Yodomia perfecta* in the same jars.

This species is evidently very closely related to *Discodermia panoplia* Sollas [1888 A] from near the Ki Islands, and might even be regarded as a variety thereof. It differs considerably, however, in the form of the desmas, which in Sollas's species are covered with low, wart-like tubercles and have not got the relatively slender terminal branches present in our species. A further difference may possibly be found in the occurrence of fusiform, slender, sharp-pointed oxea amongst the megascleres of *D. panoplia*, but Sollas has never seen these spicules entire and their nature must be regarded as somewhat enigmatical.

Sollas describes the microxea and microstrongyla of his species as "smooth," but I am inclined to think, from the examination of one of his preparations, that they are occasionally slightly roughened. On the other hand, while these spicules are typically roughened in *D. tuberosa*, they may, even in that species, be occasionally smooth or nearly so. This is notably the case in R.N. x. 5, so that I do not think that this character, taken alone, can be regarded as of specific value.

Locality, Register Numbers, &c. IX. 2 A, B, C, X. 5, S. de Malha, 4.9.05, C. 1,150 fathoms.

Genus Taprobane Dendy [1905].

Lithistidæ of plate-like form, with minute, sphinctrate apertures scattered on each side of the plate; with monocrepid, tuberculate desmas and long, slender oxea; without special ectosomal spicules and with microscleres in the form of sigmata only.

3. *Taprobane herdmani* Dendy [1905].

(Plate **1**, figs. 1, 1 *a*.)

This species, hitherto known only by a single specimen from the Gulf of Manaar, is represented in the "Sealark" collection by one magnificent dry specimen (R.N. CXLVII.) and a number of pieces in spirit (R.N. LXXIV. and CVI. 4) which are probably all fragments of another large specimen. The pieces in spirit agree very closely with the original type, but the pustule-like areas on the surface are difficult to detect without preparation. This is no doubt due to the hispidation of the surface and to the amount of foreign matter collected upon it. They can be recognized in surface sections under the microscope quite easily.

The dry specimen, of which I give a photograph (Plate **1**, figs. 1, 1 *a*), comes from the same locality (Amirante) as the pieces in spirit, but is clearly a distinct individual. It has the form of an irregularly curved plate, about 1·5 cm. thick, 27 cm. in greatest height and 31·5 cm. in greatest width. It has evidently been torn off from some support, to which it appears to have been attached by a broad base extended obliquely to the sponge-lamina. The margin of the plate is broadly rounded and undulating.

Both surfaces are still strongly hispid in places, but what I take to be the outer (inhalant) surface is extensively encrusted with foreign growths. On this surface the minute, pustule-like inhalant areas are thickly scattered and are distinctly visible where

not obscured by hispidation or foreign matter. On the inner (exhalant) surface the pustule-like exhalant areas are much more conspicuous (fig. 1 *a*) and in many cases the single vent is very distinctly visible in the middle of the circular diaphragm. Each area, with its slightly raised margin, measures a little over 1 mm. in diameter, and they are very thickly scattered over the entire surface.

As regards spiculation this specimen (R.N. CXLVII.) differs slightly from the type in the more robust character of the sigmata, which are enormously abundant. These spicules commonly show a slight roughening (minute spination), a feature which may also sometimes be present in the type, though less easily recognizable on account of the smaller size of the spicule, and overlooked in the original description. I may add that the sigmata are contort, blunt at the extremities, and measure (in R.N. CXLVII.) about 0·016 mm. in length, in a straight line between the apparent ends, by 0·002 mm. in thickness.

Previously known Distribution. Gulf of Manaar (Dendy).

Register Numbers, Localities, &c. LXXIV., CVI. 4, Amirante, 13.10.05, E. 16, 39 fathoms; CXLVII., Amirantes, 11.10.05, dredged.

Genus Petromica Topsent [1898 c].

Lithistidæ of massive form, with scattered pores and vents; with thin dermal membrane destitute of special skeleton; with monocrepid desmas feebly united or quite separate; with monaxonid rhabdi often collected in fibres which may terminate in surface conuli; without microscleres.

4. *Petromica massalis* Dendy [1905].

(Plate **1**, fig. 2.)

There is in the collection a single fine specimen (Plate **1**, fig. 2) of this interesting species, very perfect, except that it has been cut in half lengthwise. The external form is somewhat turbinate, with a constricted base of attachment and a flattened top on which are scattered large conuli, while smaller conuli occur between the large ones and also, more abundantly, scattered all over the lateral surfaces of the sponge at fairly regular intervals. The large conuli themselves appear to be made up of aggregations of small ones and the latter mark the points where the characteristic spicule-bundles of the skeleton come to the surface.

There is a very distinct dermal membrane supported on the ends of the spicule-bundles but without any skeleton of its own. It shows, however, a minutely reticulate character due to the presence of anastomosing fibrillar bands, which form a network whose principal nodes are the apices of the small papillæ. The conulose surface thus bears a close resemblance to that of many horny sponges (Euceratosa).

The specimen measures about 40 mm. in height and 45 mm. in maximum width. The colour in spirit is light brown. The vents are small and scattered, especially on the upper part of the sponge.

The cut surface shows a distinctly radial arrangement of skeletal columns. With regard to the skeleton itself I have nothing to add to my former description, the specimen agreeing

very closely with those from Ceylon. Thus the ends of the branches of the desmas are nearly always smooth and not minutely tuberculated as in *P. grimaldii* Topsent [1904 A].

Previously known Distribution. Ceylon Seas (Dendy).

Register Number, Locality, &c. XCVI. 1, Amirante, 13.10.05, E. 15, 39 fathoms.

Family **Tetillidæ**.

Tetractinellid Sigmatotetraxonida in which the skeleton is typically arranged in a radial manner. The characteristic megascleres are long-shafted protriænes and anatriænes and the characteristic microscleres are sigmata.

Genus Tetilla Schmidt [1868].

Tetillidæ without any special cortical skeleton, without porocalices and without a subdermal layer of short-shafted triænes.

The name Tethya has been used by recent writers [Baer, 1905; Lendenfeld, 1906, 1907; Hentschel, 1912] for this genus, but I have already [1916 C] given my reasons, in dealing with the genus Donatia, for abandoning the name Tethya altogether, and I adhere to Schmidt's name Tetilla, by which the genus has so long been known.

I doubt whether it is necessary to follow Lendenfeld [1906] in merging Craniella in Tetilla (Tethya), but that question does not arise in connection with the present collection.

5. *Tetilla furcifer* n. sp.

(Plate **10**, fig. 1 *a*—*k*.)

The single specimen in the collection has a somewhat curious external form. I suspect that it has been removed from some substratum to which it was not very firmly adherent. The surface of attachment (base) is oblong and almost rectangular, but with one long side of the rectangle bulging out. It is slightly and unevenly concave and exhibits a radially striated appearance due to the spicule-bundles of the skeleton, the skeleton nucleus lying at about the centre of this surface. On the upper surface the middle portion of the sponge is strongly convex and approximately hemispherical, but it flattens out towards the two ends of the base, which are quite thin. The upper surface is distinctly but not very strongly hispid and at the same time more or less thickly encrusted with fine calcareous sand. The hispidating spicules tend to point downwards like a thatch. At the margin they appear as a very slightly developed marginal fringe, though the hispidation is not really more strongly developed here than it is on other parts of the upper surface. The specimen measures 24 mm. in length by 15 mm. in greatest breadth and about 7 mm. in greatest thickness (in the middle). The colour in spirit is light chocolate brown throughout, but it may have been stained by some other specimen, of which there were many in the same jar. The texture is firm and compact.

Neither vents nor pores are visible except in microscopic sections. These show that there is a distinctly fibrous cortex, though the fibrous tissue is not very dense and is developed chiefly in its deeper portion, the outer part being rather collenchymatous with very numerous small nuclei. The two kinds of tissue are, however, to a large extent intermingled. The cortex is about 0·4 mm. thick and is not very sharply differentiated from the

underlying choanosome. The vents are probably scattered irregularly. They may be numerous but only one happens to be cut through in my sections (Plate **10**, fig. 1*a*). It is almost completely closed and lies flush with the general surface. It forms the termination of a fairly wide oscular tube surrounded by a thick layer of dense fibrous tissue, which extends inwards far below the cortex. The wall of the oscular tube contains sparse bundles of very slender prodiænes, arranged longitudinally, but with their shafts converging in the neighbourhood of the vent, with the cladi frequently projecting just outside and inside the opening. The inhalant pores seem to be very sparsely scattered over the general surface, and narrow inhalant canals pierce the cortex almost at right angles. There are no conspicuous intracortical or subcortical cavities. The histological condition of the material will not allow me to say anything as to the form or arrangement of the flagellate chambers.

The general skeleton is arranged as usual in the genus and consists of ill-defined, crowded spicule-bundles, radiating from the centrally-placed skeleton nucleus to all parts of the exposed surface, where they form the hispidating brushes and the marginal fringe. The bundles consist chiefly of long oxea, but fairly numerous prodiænes occur mixed with these in the surface brushes and marginal fringe.

Spicules:—(1) Oxea (fig. 1 *c*); straight or nearly so, fusiform, approximately isoactinal, tapering very gradually to a fine point at each end; measuring up to about 3·3 by 0·034 mm.; occasionally becoming stylote (fig. 1 *d*).

(2) Large prodiænes (fig. 1 *e*, *e'*); shaft measured up to 5·08 by 0·012 mm., with cladi about 0·078 by 0·005 mm. The shaft tapers gradually to hair-like dimensions and ends in a fine point. The variations in form of the cladome are shown fig. 1 *e'*. A few large protriænes (fig. 1 *f*, 1 *f'*) and promonænes (fig. 1 *g*) have also been observed, but the prodiænes are far more abundant.

(3) Small, hair-like prodiænes (occasionally protriænes) (fig. 1 *h*—*j'*). These occur chiefly in the wall of the oscular tube, around the vent. They differ from the large ones only in point of size and there is probably no absolute distinction even in this respect. They may be only about a quarter the length of the large prodiænes and slender in proportion.

(4) Sigmata (fig. 1 *k*); very slender, strongly contort, length in a straight line from bend to bend up to about 0·012 mm.

A very interesting feature of this species is the occurrence of a process of external gemmation. The surface of the sponge, when viewed under a lens, shows a considerable number of minute, oval bodies, of a dark brown colour, attached to projecting spicules or spicule-bundles. These bodies (fig. 1 *b*) measure about 0·5 mm. in longer diameter. Each consists of a dense, solid mass of cells, probably of the nature of amœbocytes, all crowded together. The entire mass is pierced lengthwise by a small bundle of the projecting spicules of the parent sponge, either oxea or diænes, along which it appears to be creeping outwards from the cortex, with which, in the earlier stages, it is still connected by a thick or slender stalk. Numerous sigmata are scattered through the bud, but it contains no other spicules that can be regarded as proper to it. There can be little doubt that these curious little gemmules creep out to the ends of the projecting spicules and then separate from the parent sponge altogether. A very similar process appears to take place in *Thenea muricata*, as figured by Vosmaer [1885].

This well-characterized species is perhaps nearly related to Carter's *Tetilla* (*Tethya*) *casula*, from South Africa [*vide* Carter 1871 F and Kirkpatrick 1902]. The latter is supposed to live lying freely on a sandy bottom and has a fairly well-developed marginal fringe of spicules. The external forms of the two species have much in common, but I am inclined to think that *T. furcifer* must be attached to the substratum during life, otherwise I think the margin of the sponge would have followed an approximately circular outline, as in *T. casula*. The two species also agree in the apparently complete absence of anatriænes, a very unusual feature in the genus. *T. casula*, however, has short curved oxea as well as the long straight ones, and the protriænes appear to be normal, no mention being made of diænes or monænes.

Register Number, Locality, &c. CXIX. 13, Salomon.

Genus CINACHYRA* Sollas [1886, 1888].

Tetillidæ in which the inhalant pores are for the most part localized in special porocalices. The vents may or may not take the form of similar porocalices.

This genus was proposed by Sollas for *C. barbata*, obtained by the "Challenger" Expedition at Kerguelen.

Sollas's diagnosis runs as follows: "The cortex is not excavated by subdermal cavities; oxeate spicules traverse it radiately. The incurrent and excurrent openings are confined to special flask-shaped recesses. The mesoderm of the choanosome is a collenchyma; the chamber system is eurypylous."

The genus has been widely accepted by more recent writers† and a considerable number of additional species have been assigned to it, but curiously enough not one of these possesses the radially arranged cortical oxea so characteristic of the type. All of them, however, possess porocalices, and this feature may be accepted as the most important diagnostic character‡.

The discovery of two new species by the "Sealark" Expedition and the addition of certain species originally assigned to Tetilla brings the total number of known species up to twenty, as follows:—*C. eurystoma* Keller [1891], *C. barbata* Sollas [1886, 1888], *C. vertex* Lendenfeld [1907], *C. vaccinata* n. sp., *C. trochiformis* Keller [1891 A], *C. nuda* Hentschel [1912], *C. schulzei* Keller [1891], *C. cinachyroides*§ (Hentschel) [1911 A], *C. mertoni* Hentschel [1912], *C. isis* Lendenfeld [1906], *C. providentiæ* n. sp., *C. alba-bidens* Lendenfeld [1906], *C. hirsuta* (Dendy) [1889], *C. anomala* (Dendy) [1905], *C. phacoides* Hentschel [1911 A], *C. malaccensis* I. B. J. Sollas [1902], *C. voeltzkowi* Lendenfeld [1897], *C. hamata* Lendenfeld [1906], *C. alba-obtusa* Lendenfeld [1906], *C. alba-tridens* Lendenfeld [1906]. Lendenfeld [1903] also includes in the genus Kieschnick's *Tetilla amboinensis* [1900] and Carter's *Tethya cranium* var.

* Originally spelt *Cinochyra* but altered by the author in the "Challenger" Report.

† *Vide* especially I. B. J. Sollas [1902] and Kirkpatrick [1905] for useful information.

‡ Lendenfeld [1903] lays chief stress upon the arrangement of the vents in porocalices and does not mention the inhalant pores in his diagnosis. The arrangement of the latter appears to me to be more constant than that of the vents. In my *Tetilla poculifera* [1905] the vents appear to take the form of porocalices while the inhalant pores are scattered, and I exclude such species from the genus Cinachyra.

§ Referred by Hentschel to the genus Tetilla but almost certainly a Cinachyra.

robusta [1887], but the former species obviously belongs to my genus Paratetilla, which is sharply distinguished from Cinachyra by the presence of calthrops or short-shafted triænes arranged in a special layer beneath the surface, while the latter has been shown by Sollas [1888] and Kirkpatrick [1905] to be a Tetilla.

The task of discriminating between the various species of Cinachyra appears by no means an easy one at first sight, but a careful study of the genus leads to some very interesting results. The following characters seem to afford the most valuable guides :—

(1) The presence or absence of trichodragmata. These spicules occur in only a single species, *C. eurystoma*, which might on this account be regarded as the type of a distinct genus, as has been done in several analogous cases, but trichodragmata are so widely distributed amongst the Tetraxonida, and in such a curiously sporadic manner, that I am beginning to doubt the advisability of using them for purposes of generic distinction. Each case must, however, be judged on its merits, and it is hardly possible to be consistent in this respect.

(2) The presence or absence of small oxea, in addition to the large oxea of the radial bundles. Such small oxea occur in ten of the twenty species. They are usually scattered quite irregularly in the interior of the sponge, often in very large numbers. Their presence is interesting as indicating a possible origin of the short oxea which form the reticulate skeleton of the *Gelliinæ*.

(3) The presence or absence of short, radially arranged, cortical oxea, found only in *C. barbata*. It is perhaps doubtful whether or not these belong to the same category as the foregoing. The presence of similar cortical spicules in Craniella has been regarded as the chief justification for the separation of that genus from Tetilla.

(4) The presence or absence of minute siliceous globules or microspheres, which occur in several species and seem to be distinctive*.

(5) The presence or absence of very small, hair-like protriænes, hispidating the pore-membrane in the porocalices. This character occurs in *C. eurystoma*, *C. barbata*, *C. vertex*, *C. vaccinata*, *C. alba-bidens* and *C. hirsuta*, and seems to have arisen by spreading inwards, accompanied by reduction in size, of the protriænes which are so commonly met with around the opening of the porocalyx. The extent to which this has been accomplished varies in different cases. In *C. hirsuta* the process seems to have only just begun and there are very few of the small hispidating protriænes, apparently confined to the region near the mouth of the porocalyx; in *C. vaccinata*, on the other hand, the character is very strongly developed. It is a singular fact that it is apparently not developed at all in *C. nuda*, which so closely resembles *C. vaccinata* in most respects.

(6) The shape of the porocalices—whether shallow and wide or deep and narrow, with small external apertures, or slit-like. Though there are great differences between the extremes, intermediate conditions occur and something, doubtless, depends upon the state of contraction, but nevertheless the character seems to be a distinctly useful one for taxonomic purposes.

* In my report on the Ceylon sponges [1905] I attached less taxonomic importance to the small scattered oxea and microspheres than I am now inclined to do, and referred to *Tetilla* (*Cinachyra*) *hirsuta*, in which both are absent, a specimen in which both are present (R.N. 129). I can no longer maintain this identification.

(7) The arrangement of the porocalices. In one species only (*C. trochiformis*) they are confined to a sharply defined zone round the base of the sponge, but an approach to this condition is found in certain other species such as *C. anomala*.

(8) The presence of groups of vents distinguishable from the porocalices, as in *C. vaccinata*, *C. nuda* and *C. mertoni*. In most cases oscular chambers and porocalices appear to be indistinguishable*.

The characters above enumerated suffice for the discrimination of most of the species, but in a few cases they have to be supplemented by characters drawn from spicular measurements or from the suppression of cladi in the triænes. The spicules, however, seem to exhibit remarkably little variation in form throughout the genus, the most notable exception being the triænes of *C. vaccinata*, which seem all to have a very characteristic enlargement of the apex of the shaft. The following dichotomous key shows how the characters mentioned can be utilized for the determination of the species. It is, of course, largely an artificial arrangement, adopted merely as a matter of convenience, and much more investigation will be necessary before we can hope to draw up a scheme which shall adequately represent the phylogenetic relationships of the species.

KEY TO THE KNOWN SPECIES OF CINACHYRA.

1.	With trichodragmata	*C. eurystoma*, Red Sea.
	Without trichodragmata	(2)
2.	With small as well as large oxea	(3)
	Without small oxea	(12)
3.	With small cortical oxea radially arranged	*C. barbata*, Kerguelen.
	Without radially arranged cortical oxea	(4)
4.	Pore-membranes hispidated by hair-like protriænes	(5)
	Pore-membranes not hispidated by hair-like protriænes	(6)
5.	Shafts of triænes without enlarged apices. Surface shaggy, with long, separate tufts of projecting spicules ...	*C. vertex*, Antarctic.
	Shafts of triænes with enlarged apices. Surface without long, separate tufts of projecting spicules	*C. vaccinata*, Diego Garcia.
6.	Porocalices confined to well-defined zone around base of sponge ...	*C. trochiformis*, Red Sea.
	Porocalices not confined to well-defined zone around base of sponge ...	(7)
7.	Without anatriænes	*C. nuda*, Arafura Sea.
	With anatriænes	(8)
8.	With microspheres	(9)
	Without microspheres	(10)
9.	Porocalices cup-shaped, with wide openings	*C. schulzei*, Coast of Aden and Mozambique Channel.
	Porocalices slit-like, with narrow openings	*C. cinachyroides*, N.W. Australia.
10.	Groups of vents sharply distinguished from porocalices	*C. mertoni*, Kei Islands.
	Vents not distinguishable from porocalices	(11)
11.	Porocalices cup- or flask-shaped, not greatly elongated radially ...	*C. isis*, N.W. Australia.
	Porocalices bottle-shaped, greatly elongated radially	*C. providentiæ*, Providence.
12.	Pore-membranes hispidated by hair-like protriænes	(13)
	Pore-membranes not hispidated by hair-like protriænes	(14)
13.	Porocalices bottle-shaped, greatly elongated radially, with very small external openings	*C. alba-bidens*, S.W. Pacific.
	Porocalices cup-shaped or tubular, with wide external openings ...	*C. hirsuta*, Gulf of Manaar.

* Compare, however, Kirkpatrick [1905].

14.	Porocalices comparatively shallow, with wide external openings ...	(15)
	Porocalices bottle-shaped, greatly elongated radially, with very small external openings	(18)
15.	With microspheres	*C. anomala*, Ceylon.
	Without microspheres	(16)
16.	Some of the porocalices with relatively large internal openings, probably vents	*C. phacoides*, S.W. Australia.
	Porocalices apparently all alike	(17)
17.	Oxea not more than 3·5 mm. long	*C. malaccensis*, Malay Peninsula.
	Oxea up to 5 mm. long	*C. voeltzkowi*, Zanzibar.
18.	All or many of the anatriænes represented by anamonænes ...	*C. hamata*, Agulhas Bank.
	Anamonænes absent	(19)
19.	Some of the triænes with cladi reduced to stumps	*C. alba-obtusa*, New Guinea.
	Triænes nearly always with well-developed cladi	*C. alba-tridens*, Diego Garcia.

The genus Cinachyra is widely distributed in the Indian Ocean, extending westwards to the Red Sea, eastwards to the west coast of Australia and through the Malay Archipelago to the S.W. Pacific, and southwards to the Antarctic. It does not appear to be known outside this region. Many of the species occur on coral reefs or in similar situations where the water is apt to be charged with fine sand or mud, and the arrangement of the inhalant pores, and sometimes of the vents also, in specially protected groups more or less concealed within the porocalices, must be regarded as an adaptation to the special conditions of the environment. The genus may be a polyphyletic one, but most, at any rate, of the species seem to be closely related to one another.

6. *Cinachyra vaccinata** n. sp.

(Plate **1**, fig. 4; Plate **11**, fig. 1 *a*—*l*.)

There are two specimens of this interesting sponge in the collection, both from Diego Garcia. The larger one (Plate **1**, fig. 4) appears to have been quite perfect when received, except that it had probably been torn away from a small area of attachment at one end. It is irregularly oval in shape, about 56 mm. in length by 45 mm. in maximum diameter. The surface is largely occupied by the very numerous, irregularly scattered porocalices. These vary greatly in shape and size. They may be deeply cup-shaped or pocket-shaped, or more shallow cups, or even plain, flat areas, flush with the general surface but circumscribed by a slightly raised margin; in diameter they vary up to about 11 mm. It seems possible that the differences in the form of the porocalices may be due partly to differences in the state of contraction. In one case the cup is deep and the mouth is closed to a narrow slit. There are two groups of small vents, each group occupying a rather shallow depression only about 4 mm. in diameter. One group contains about a dozen vents, varying in diameter and closely crowded together; the other not so many. The vents are not covered over by a pore-membrane but are freely exposed in the bottom of the oscular depression. Both groups lie on the same side of the sponge, one near one end and the other near the other, which seems to indicate that this was the upper surface. It is possible that there may also be a few small, singly scattered vents, but if so I cannot distinguish them from the smallest porocalices. The surface of the sponge between the

* So called from the resemblance of the flattened pore-areas to vaccination marks.

porocalices is almost quite smooth, though thinly encrusted in places with a deposit of whitish calcareous mud. The sharp margin of a porocalyx is occasionally slightly hispid. The surface of the pore-bearing membrane appears smooth to the naked eye but is microscopically hispid with the hair-like protriænes, amongst which a deposit of fine mud is entangled. The colour in spirit is pale yellowish grey and the texture fairly firm and compact.

The second specimen (R.N. LVIII.) is rather smaller, but the lower part of it has evidently been torn off. The general surface is rather more hispid and rather more thickly encrusted. The remaining porocalices are for the most part deeply funnel-shaped and there are none of the perfectly flattened ones. There is a group of small vents in a strongly depressed oscular area not far from the middle of the upper surface, the diameter of the oscular area being about the same as in the other specimen. The colour is the same.

The skeleton of the sponge is, as usual, strongly radiate, consisting for the most part of somewhat ill-defined bundles of very long and rather slender oxea. The terminal portions of these bundles spread out slightly to form surface brushes which penetrate through the encrusting layer of fine mud to a greater or less extent. These surface brushes contain numerous anatriænes and occasional, well-developed protriænes. A very characteristic feature of the skeleton is the occurrence of numerous long, slender, sinuous fibres or bundles of hair-like protriænes. These come from within the sponge and run up to the under surfaces of the pore-membranes of the porocalices in great numbers (Plate **11**, fig. 1 *a*). Here they break up into elegant, divaricating tufts, and some of the cladomes, together with a longer or shorter portion of the shaft, project freely from the surface of the pore-membrane between the inhalant pores (fig. 1 *b*). Both specimens contain numerous short, slender oxea scattered in the soft tissues between the skeletal bundles, but these spicules are far more numerous in the smaller of the two specimens.

Spicules:—(1) Large oxea (fig. 1 *c*); long, slender, straight or slightly curved, fusiform, very gradually and finely pointed at each end, measuring up to about 3·7 by 0·034 mm. Occasionally stylote (fig. 1 *d*). Some very slender oxea of about the same length are possibly young.

(2) Relatively large protriænes and prodiænes (fig. 1 *c*—*f'*); with long, slender shaft tapering away from the cladome to hair-like dimensions and then terminating in an elongatedly oval swelling; cladi slender, slightly crooked, fairly sharply pointed, usually about equal in length. It is difficult to find these spicules in an unbroken state suitable for measurement, but the shaft seems to measure up to some 3 or 4 mm., or even more, in length with a diameter of about 0·01 mm. just below the cladome; with cladi about 0·14 by 0·008 mm., but of course variable. They occur sparingly in the ordinary surface brushes.

(3) Small, hair-like protriænes and prodiænes (fig. 1 *g*—*h'*); similar in form to the larger ones; with the enlarged distal extremity very conspicuous; length of shaft about 1·3 mm., with a diameter just below the cladi of 0·003 mm.; with cladi about 0·032 by 0·0025 mm. The cladi seem to be straighter than in the larger forms. These spicules are extremely abundant in relation with the porocalices (see also fig. 1 *a*, *a'*).

(4) Anatriænes (fig. 1 *j*, *j'*); with well-developed cladome and very long and slender shaft ending in an elongated inflation as in the case of the protriænes; cladi fairly strongly recurved and sharply pointed. In the only unbroken specimen, suitable for measurement, that I have been able to isolate, the shaft measures about 1·8 mm. in length by 0·005 mm. in diameter just below the cladome, and the cladi about 0·037 by 0·005 mm.; as, however, the cladi may be about twice this length, we must assume that the shaft may be larger in proportion, and this probably is usually the case.

(5) Short, slender oxea (fig. 1 *k*); usually slightly curved or even angulated in the middle; fusiform; finely and gradually pointed at each end; measuring about 0·2 by 0·004 mm.

(6) Slender, contort sigmata (fig. 1 *l*); up to about 0·016 mm. in maximum length from bend to bend; smooth or nearly so.

The above descriptions and measurements of the spicules are taken from R.N. LXVII. 2, but the other specimen agrees very closely.

The histological preservation of the material is not satisfactory, and stained paraffin sections show but little detail. It is easy to see, however, that there is no true cortex, but a rather thick, gelatinous ectosome, with a more or less well-marked tendency to become fibrous, especially in its outer portion. There may perhaps be a small number of inhalant pores outside the porocalices, but I cannot attribute any systematic importance to this character, as is done by Miss Sollas [1902].

So far as general external appearance and the arrangement of the vents and porocalices are concerned this species agrees remarkably closely with Hentschel's *Cinachyra nuda* from the Arafura Sea [1912]. It also agrees with that species in the presence of the small oxea, but it differs in the possession of anatriænes and the presence of the hair-like protriænes developed in relation to the porocalices. The last-mentioned character it shares with *C. barbata* Sollas [1888] from Kerguelen, *C. vertex* Lendenfeld [1907] from the Antarctic, *C. eurystoma* Keller [1891] from the Red Sea, *C. hirsuta* (Dendy) [1889] from the Gulf of Manaar, and *C. alba-tridens* Lendenfeld from Diego Garcia [1906]. The first four of these differ widely from our species in other respects. The fact that *C. alba-tridens* comes from Diego Garcia makes one suspect that it might be identical with *C. vaccinata*, but the form of the porocalices seems to be quite different and the small oxea seem to be wanting in that species. Moreover the apparently constantly enlarged extremities of the shafts of all the triænes in *C. vaccinata* constitute, so far as I am aware, a unique character in the genus.

Register Numbers, Localities, &c. LVIII., LXVII. 2, Diego Garcia, 10.7.05, 12½ fathoms.

7. *Cinachyra isis* Lendenfeld [1906].

(Plate **10**, fig. 3 *a*—*b*.)

The single specimen of this sponge in the collection is spherical and about 25 mm. in diameter. The surface is rough and almost shaggy, the projecting spicules being matted together and intermingled with calcareous sand. There is no evidence of attachment. The colour in spirit (after formalin) is light brown throughout. The porocalices are fairly numerous, irregularly scattered, cup-shaped, with wide external openings varying greatly

in diameter up to about 3 mm. Exhalant openings cannot be distinguished. Altogether the sponge closely resembles Lendenfeld's figure of *C. isis*, but the specimen is much smaller.

Stained sections show that there is no fibrous cortex. The ectosome cannot be sharply distinguished from the choanosome and both are crowded with large, rounded, oval or irregular cells densely filled with very minute granules. These cells are about 0·012 mm. in diameter. It is to them that the colour of the sponge is due.

The skeleton is arranged as usual. The cladi of protriænes occur abundantly in the surface fur and in the outer portions of the radial spicule-bundles. The cladi of anatriænes are abundant in the latter locality, at about the junction between ectosome and choanosome. There are no small protriænes hispidating the pore-bearing membrane in the porocalices.

Spicules:—(1) Large oxea; stout, fusiform, sometimes slightly anisoactinal, gradually and finely pointed at each end, commonly measuring about 3·6 by 0·06 mm., but measured up to 4·3 by 0·078 mm. These spicules are thus a good deal smaller than those described by Lendenfeld, which measured 5·4 to 7·1 mm. by 0·045 to 0·086 mm. Ours is, however, a much smaller specimen and this probably accounts for the difference. Lendenfeld also says that these spicules are rather strongly anisoactinal and that the ends are rather blunt, but there is no specific distinction in these characters.

(2) Protriænes (Plate **10**, fig. 3*a*—*a*″); with long, slender shaft tapering very gradually to hair-like dimensions, without any terminal inflation; measuring, say, about 3·8 by 0·014 mm. Cladome very variable. Cladi straight or rather crooked, inclined forwards at angles of about 40°; usually equally developed; up to about 0·12 mm. in length, but commonly less. I have once seen a prodiæne; and once a protriæne with one cladus unequally bifurcate close to the base.

(3) Anatriænes (fig. 3*b*); with very slender, hair-like shaft and slender, sharply-pointed cladi moderately recurved. In a typical example the shaft measures about 2·7 by 0·005 mm. (below the cladome) and tapers away to a very slender hair without any terminal inflation, while the cladi are of almost the same diameter at the base and about 0·04 mm. long. The shaft is sometimes a little longer and I have once seen the cladi nearly twice the length given.

(4) Short oxea; abundantly scattered in the choanosome, scarce in the ectosome. Straight, slender, finely pointed at each end; measuring about 0·18 by 0·004 mm.

(5) Sigmata; strongly contort, very slender, measuring up to about 0·012 mm. in maximum length in a straight line from bend to bend, and only about 0·001 mm. in thickness. Lendenfeld describes the sigmata in *C. isis* as attaining a length of from 20—28 μ, with a thickness of 1μ. He does not say what he means by "length," but if he uses that term in the same sense that I do, the sigmata of the type are about twice as long as those of our specimen. He also speaks of their being "feindornig," a character which may possibly be recognizable in our specimen under a very high power, but which is certainly so slightly developed that no stress can be laid upon it.

Thus there appear to be certain slight differences in spiculation between the "Sealark" specimen from the Seychelles and the type of the species from the north-west coast

of Australia, but these differences cannot be regarded as amounting to specific distinction.

Previously known Distribution. N.W. coast of Australia (Lendenfeld).

Register Number, Locality, &c. CXXXIII. 4, Seychelles, F. 9, 37 fathoms.

8. *Cinachyra providentiæ* n. sp.

(Plate **1**, figs. 5, 5 *a*; Plate **10**, fig. 2 *a—f*.)

The largest specimen (Plate **1**, figs. 5, 5 *a*) is an irregularly hemispherical sponge about 80 mm. in diameter, which has evidently been torn off from its base of attachment, the actual lower surface showing as a section through the so-called "nucleus" from which the spicule-bundles radiate. The upper surface is uneven, extensively encrusted in one place by a thin nullipore, in another by a coral. Elsewhere it is covered by a well-developed fur of spicules mingled with fine calcareous sand, the spicules being chiefly the projecting portions of anatriænes, now mostly broken off and matted together. Here and there all over the exposed surface are scattered the well-defined, circular or oval openings of the porocalices. These openings vary greatly in size, probably in accordance with their state of contraction. They are usually very small, sometimes not more than 1 mm. in diameter, but the largest has a diameter of 4 mm. At a short distance within each opening there is usually a well-developed sphincter-diaphragm, easily visible under a pocket-lens. When the sponge is cut open the porocalices are seen to be radially elongated, much longer than broad, and more or less bottle-shaped. They may extend two-thirds of the way in towards the centre of the sponge. The largest I have seen measures 29 mm. in depth, with a maximum breadth (in the middle) of 10 mm. and an external opening about 3 mm. in diameter. The surface of the porocalyx is lined by a finely reticulate membrane, with pore-sieves in the meshes of the reticulation. There appear to be no vents distinct from the porocalices.

The colour of the sponge throughout is pale yellowish grey. The texture is firm and compact between the porocalices, but it readily splits up radially.

There is no true cortex but a fairly sharply differentiated ectosome about 1 mm. thick and of a slightly paler colour than the choanosome. This ectosome appears to be collenchymatous rather than fibrous in character.

The skeleton has the usual strongly radiate arrangement so characteristic of the genus, and consists chiefly of densely crowded bundles of large oxea with but narrow intervals between them. Mingled with these oxea are numerous anatriænes, whose cladi, in addition to projecting from the surface, may also appear abundantly at the junction of ectosome and choanosome. Protriænes are far less numerous but they occur abundantly around the external openings of the porocalices, which seems to be their favourite situation in species of Cinachyra. There are no small protriænes hispidating the pore-bearing surface of the porocalices.

Spicules:—(1) Large oxea (Plate **10**, fig. 2 *a*); straight or slightly curved; fusiform, tapering very gradually to each extremity; ends variable, from very finely pointed to strongylote, sometimes irregular; size up to about 6·0 by 0·077 mm. Occasionally these spicules become stylote, sharply pointed at one end and broadly and evenly rounded off at the other (fig. 2 *b*).

(2) Protriænes (fig. 2 *c*, *c'*); with very long, slender shaft and relatively very short cladi directed forwards at angles of about 30°. Cladi approximately straight, fairly stout and fairly sharply pointed. A typical example had a shaft measuring 6·7 by 0·02 mm. (at the thickest) and cladi about 0·06 mm. long by 0·012 mm. thick at the base*. The shaft tapered away very gradually to the apex, which was bluntly pointed but without any terminal inflation. Another example, with the end of the shaft broken off, was about 8·5 mm. long, the shaft had a maximum diameter of 0·02 mm., and the cladi, rather irregularly bent, were only about 0·028 mm. long. A third, perfect example, had a shaft 7·7 by 0·02 mm., and cladi averaging about 0·06 by 0·012 mm., one being rather longer than the others. The cladi may be irregular and I have seen one bifurcate. In another case all three were equally developed and each 0·12 mm. long.

(3) Anatriænes (fig. 2 *d*, *d'*); with long, slender, hair-like shaft and well-developed cladome, with gradually sharp-pointed cladi curving backwards on arcs of a sphere. The shaft has no terminal dilatation. In a typical example the shaft measured about 5 mm. in length by 0·014 mm. in diameter (below the cladome), and the cladi about 0·07 by 0·012 mm.; the chord of the cladome measuring 0·1 mm.

(4) Short, slender oxea (fig. 2 *e*); usually very slightly curved; fusiform; gradually and sharply pointed at each end; size about 0·22 by 0·0055 mm.

(5) Sigmata (fig. 2 *f*); slender, contort, smooth (or very nearly so), measuring about 0·016 mm. in maximum length from bend to bend.

The above details of the spiculation are taken from R.N. XXI. 1, which must be regarded as the type of the species.

This species evidently comes very near to von Lendenfeld's *Cinachyra alba-tridens* [1906] from Diego Garcia, differing principally in the presence of the short, slender oxea. Lendenfeld says that the sigmata in his species are microspined, but this character is often so slight and difficult to determine that it has little taxonomic value. He also speaks of the presence of peculiar sigmata which he terms "Simotoxe," but these are very scarce and seem to be merely abnormal forms of the ordinary sigmata.

There is a second specimen (R.N. XX. 3) from the same locality (Providence) as the one described above and agreeing very closely with it; it represents about half of a somewhat smaller sponge. R.N. XXV. 2 and LXXVIII. 6 may also be referred provisionally to the same species. They both come from Cargados Carajos and differ slightly from the type in certain respects, but the material is hardly sufficient to deserve special consideration. All these specimens contain the characteristic small oxea, and as von Lendenfeld had three specimens of *C. alba-tridens*, presumably all without the small oxea, it seems likely that the presence or absence of these spicules will furnish a valid specific distinction.

Register Numbers, Localities, &c. XX. 3, Providence, 4.10.05, D. 3, 29 fathoms; XXI. 1, Providence, 3.10.05, D. 1, 39 fathoms; ? XXV. 2, Cargados Carajos, 31.8.05, B. 20, 28 fathoms; ? LXXVIII. 6, Cargados Carajos, 28.3.05, B. 2, 30 fathoms.

* One of the cladi was broken short.

9. *Cinachyra anomala* (Dendy).

(Plate **1**, fig. 3.)

Tetilla anomala Dendy [1905].

The type of this species, collected by Professor Herdman at Ceylon, was an imperfect fragment in which no porocalices were visible; judging from the specimens now before me they must all have been removed with the portion of the sponge torn away, as might very well happen.

A specimen (Plate **1**, fig. 3) collected by the "Sealark" Expedition at Cargados Carajos is in a much better state of preservation. It is sub-spherical, about 30 mm. in maximum diameter, and has evidently been attached by a somewhat contracted base about 13 mm. in diameter. Around and just above this base are numerous porocalices, arranged in an ill-defined zone occupying the lower third of the surface or thereabouts. The upper two-thirds of the surface are quite free from porocalices, and show no vents. The porocalices are cup-shaped or pocket-shaped and run more or less vertically upwards from the wide external opening, which is about 1—3 mm. in diameter. (In the type specimen narrow inhalant canals were described penetrating the ectosome here and there. The occurrence of such isolated inhalant canals outside the porocalices has been described in *C. voeltzkowi* Lendenfeld [1897].)

The general surface of the Cargados specimen is covered with a thin, whitish crust, composed of projecting spicules and calcareous sand. In the lower part of the sponge the spicules show some tendency to project downwards over the openings of the porocalices, like a thatch. The colour of the sponge internally is dirty greyish yellow with distinctly brown ectosome; the surfaces of the porocalices are light brown.

The arrangement of the skeleton calls for no special comment beyond the statement that there are no small protriænes hispidating the pore-bearing membrane of the porocalices.

The spiculation agrees very closely with that of the type. The minute siliceous spherules (microspheres) are thickly scattered through the choanosome.

A second specimen (R.N. XLVII. 5) obtained by the "Sealark" Expedition at Praslin Reef, but not in such a good state of preservation, bears a close resemblance to the first in general appearance and spiculation; but the siliceous spherules, if indeed present, are not nearly so numerous, nor are the anatriænes, and the identification must remain doubtful. Similar remarks apply to R.N. LVII. 3, from Coin Peros, in which, however, anatriænes are abundant. This specimen is of a light chocolate brown colour throughout and heavily encrusted with calcareous sand.

The chief distinguishing characters of this species are the widely open, cup-shaped porocalices, the presence of microspheres or siliceous globules, the absence of small oxea, and the absence of small protriænes hispidating the surface of the porocalices.

Previously known Distribution. Ceylon Seas (Dendy).

Register Numbers, Localities, &c. XXXIII. 4, Cargados Carajos, 30.8.05, B. 13, 30 fathoms; ? XLVII. 5, Praslin Reef; ? LVII. 3, Coin Peros.

Genus Paratetilla Dendy [1905].

Tetillidæ with an ectosomal layer of short-shafted triænes, resembling calthrops and usually very irregular in shape. Commonly or always (?) with porocalices.

This genus appears to be very characteristic of the Indian Ocean and Western Pacific, but it is doubtful whether more than a single very variable species (*P. bacca*) can at present be recognized. Hentschel [1912] has expressed the opinion that Lendenfeld's genus Amphitethya [1906] should be regarded as synonymous with Paratetilla, a genus which was ignored by Lendenfeld although he himself suggested that *Tetilla bacca*, or a part thereof, should be included in Amphitethya. I am inclined to think, however, that Amphitethya, which has a very peculiar form of sigma in addition to its amphitriænes, and is, moreover, devoid of porocalices, may very well be kept distinct. The discovery by Topsent [1897 A] of amphitriænes, occurring apparently as an abnormality in one specimen of *Paratetilla bacca* (*Tetilla merguiensis*), can certainly not be regarded as a sufficient reason for identifying the two genera. The generic position of Hentschel's *Paratetilla aruensis* [1912], in which amphitriænes also occur, is more doubtful, but for the present it may well remain as a second species of Paratetilla.

10. *Paratetilla bacca* (Selenka).

Stelletta bacca Selenka [1867].
Tethya merguiensis Carter [1883 B, 1887].
Tetilla merguiensis Sollas [1888].
Tetilla ternatensis Kieschnick [1896].
Tetilla merguiensis Topsent [1897 A].
Tetilla bacca Lindgren [1898].
Tetilla amboinensis Kieschnick [1900].
Tetilla violacea Kieschnick [1900].
Tetilla rubra Kieschnick [1900].
Tetilla bacca Thiele [1900].
Tetilla bacca Lendenfeld [1903].
Cinachyra amboinensis Lendenfeld [1903].
Paratetilla cineriformis Dendy [1905].
Paratetilla eccentrica Row [1911].

This appears to be a very variable species, a fact which accounts for its having been described under so many distinct specific names. I have tried in vain to discover distinguishing characters by which the various described forms could be really separated into species, and am at length constrained to follow the example of Thiele [1900] who identified all the then described species with Selenka's *Stelletta bacca*, and to apply the same treatment to my own *P. cineriformis* and Row's *P. eccentrica*.

Selenka's original description was highly unsatisfactory, and he even speaks of the spicules as calcareous, but fortunately he gives excellent figures of both the external form and the principal spicules, so that an identification is not difficult. The former shows a sponge with a strongly hispid surface and no less than sixteen large "Auströmungs öffnungen," as the author terms them. The failure to interpret these openings correctly has been one of the sources of confusion with regard to this species. I have no doubt that in Selenka's specimen, as in the fairly numerous specimens examined by myself, they are really porocalices, for they are far too numerous to be oscula. Subsequent writers have also failed to distinguish properly between oscula and porocalices, so that Lendenfeld was led to include some of the described forms in the genus Tetilla and others in Cinachyra. It seems doubtful whether true oscula, as distinct from porocalices, are ever present.

Although the surface generally appears to be more or less strongly hispid it is some-

times almost entirely devoid of projecting spicules, as in the variety *corrugata* described below. The dark colour of the more superficial parts of the sponge, almost black in spirit, is evidently a very characteristic feature.

As regards spiculation the most striking character is, of course, afforded by the curious short-shafted triænes of the ectosome, and the great variation in form to which these are subject has been largely responsible for several supposed specific distinctions. In the original type these spicules appear to have been predominantly, if not entirely, regular, or subregular, with straight rays. An extreme deviation from this condition is found in Row's *Paratetilla eccentrica*, characterized by great abnormality in these spicules, shown in the reduction and contortion of the rays. Between these extremes all sorts of intermediate conditions occur. These spicules also vary very greatly in number in different specimens, being very abundant in some and very rare in others.

Another difficulty arises in connection with the short, slender, hair-like oxea, often scattered abundantly in the choanosome. These are probably always present, but have been overlooked by several writers, as by myself in *P. cineriformis*, in which they actually exist in a vestigial condition.

The species is highly characteristic of the Indian Ocean and extends westwards to the Red Sea and eastwards to Samoa. It has hitherto been recorded from the following localities :—Samoa (Selenka), Torres Straits (Sollas), Amboina (Topsent, Kieschnick), Ternate (Kieschnick), Java Sea and Gaspar Straits (Lindgren), Mergui Archipelago (Carter), Ceylon (Dendy), Red Sea (Row).

Paratetilla bacca is represented in the "Sealark" collection by a considerable number of specimens, most of which agree very closely with Kieschnick's *Tetilla violacea* from Amboina, which may be reduced to varietal rank. One specimen, however, seems sufficiently distinct from any previously described form to merit description under a new varietal name (*P. bacca* var. *corrugata*).

10 *a*. *Paratetilla bacca* var. *violacea* (Kieschnick).

(Plate **1**, fig. 6.)

I identify with this variety seven specimens which all agree pretty closely in external form and spiculation. The shape of the sponge (Plate **1**, fig. 6) is more or less spherical, with a more or less restricted base of attachment. The largest specimen (R.N. CXI. 1) measures about 55 mm. in diameter, the smallest (R.N. LIII. 3) about 20 mm. One specimen (R.N. LII. 7) gives off a strap-shaped process, about 15 mm. long and 4 mm. wide, from a point above the base; this looks as if it might be an attachment process such as those described by Topsent [1897 A], but which has not yet found the substratum. The degree of hispidation of the surface varies much, depending largely upon the extent to which the projecting ends of the spicules have been broken off. Thus in R.N. XLVII. 4 the spicules are nearly all broken off close to the surface, which appears nearly smooth, while in R.N. CXI. 1 it is distinctly hairy, with a large amount of calcareous sand entangled amongst the projecting spicules. Each specimen bears numerous porocalices, distributed pretty evenly over the surface. These are provided with sphincter diaphragms and their appearance depends much upon the state of contraction. When completely

closed they are hardly visible, but when fully open they are conspicuous cup-shaped depressions, approximately hemispherical in shape and with wide apertures about 4 mm. in diameter. There are no recognizable vents apart from the porocalices, but the examination of stained sections (R.N. CXIX. 3) shows that pores are not confined to the porocalices but also occur scattered between them. The colour of the sponge (in spirit) is dark chocolate brown, becoming paler in the interior.

The spiculation agrees pretty closely with that of the variety about to be described and calls for no special comment, except that the spindle-shaped oxea never appear to exceed about 4 mm. in length, with a diameter of about 0·048 mm., and are usually less, say about 3·4 by 0·043 mm. In this respect, therefore, the "Sealark" specimens agree fairly well with Kieschnick's *Tetilla violacea*, in which the oxea measure up to 3·0 by 0·045 mm., and differ from the Samoan type of the species, in which, according to Selenka, the oxea measure 5—7 mm. in length by 0·04 mm. in thickness. The smaller size of the oxea appears to constitute the chief distinguishing feature of the variety *violacea* as compared with the type.

The sigmata in the "Sealark" specimens seem to be rather smaller than in Kieschnick's specimen, measuring only about 0·016 mm. in extreme length from bend to bend, while Kieschnick gives 0·02 mm., but does not say how his measurement was taken.

Register Numbers, Localities, &c. XLVII. 4, Praslin Reef; LII. 7, LIII. 2, 3, Coetivy; CXI. 1, Egmont Reef; CXIX. 3, 9, Salomon.

10 *b*. *Paratetilla bacca* var. *corrugata* nov.

(Plate **1**, fig. 7.)

The single specimen in the collection (Plate **1**, fig. 7) is a large fragment of an apparently spherical or hemispherical sponge with a radius of about 35 mm. The surface has a very uneven, corrugated appearance, due chiefly to the occurrence of numerous deep porocalices, whose openings are usually elongated and slit-like and sometimes form a meandriniform pattern, due apparently to fusion of contiguous porocalices. Between the porocalices the surface is uneven and hummocky, but at the same time subglabrous, with only a very few projecting spicules scattered here and there. The depth of the porocalices may be at least 10 mm., their openings are large but vary greatly in size. No ordinary vents are visible in the specimen. The texture is firm and compact, but compressible laterally. It is strongly fibrous radially and readily splits up in the direction of the fibres. The colour externally (in spirit) is dark purplish brown, almost black, internally it is very pale yellowish brown.

The boundary between ectosome and choanosome is quite indefinite. The ectosome is not very distinctly fibrous except where it forms the walls of the porocalices, but it is very densely charged with minute brown pigment granules, less abundant in the walls of the porocalices than elsewhere. These pigment granules also invade the choanosome, gradually becoming less numerous towards the interior of the sponge. Their abundance in the ectosome probably conceals to a large extent the fibrous character of the latter.

The porocalices have smooth walls pierced by very numerous minute pores, communicating by numerous narrow canals with irregular subcortical crypts, from which inhalant

or exhalant canals run inwards. The state of preservation of the specimen will not allow of my saying anything about the flagellate chambers, the choanosome in its present condition being compact and almost uniformly granular.

The main skeleton consists of stout radiating bundles of large oxea and triænes, with very wide intervals between the bundles. Even at the surface of the sponge wide gaps exist between the slightly expanded ends of the bundles. The outer portions of the bundles, in the ectosome, contain the cladomes of numerous anatriænes, with protriænes around the openings of the porocalices. The walls of the porocalices are not hispidated by any spicules. The radiating bundles pass to the surface between the porocalices, and very few spicules project beyond the surface at all, and then usually only to a very slight extent. In the ectosome are irregularly scattered the short-shafted triænes characteristic of the genus. They are sparsely developed and do not appear to be accompanied by any paratangential oxea. They seem to be completely absent from the walls of the porocalices.

Spicules:—(1) Large oxea; stout, straight, fusiform, approximately iso-actinal, sometimes gradually and finely pointed at each end, but frequently stylote or strongylote in varying degrees, or with irregularly pointed apices; measuring up to about 3·8 by 0·05 mm. and usually only a little less. These spicules frequently have the axial canal greatly enlarged.

(2) Protriænes. There seem to be two fairly distinct varieties of this spicule, but doubtless intermediate forms occur: (*a*) with very long, slender shaft, tapering very gradually to almost hair-like dimensions but ending in a blunt point; thickest not far from the middle; measuring about 6·0 by 0·02 mm.; cladi short, stout, rather crooked, equal in length, measuring about 0·08 by 0·012 mm.; (*b*) with much longer and relatively more slender cladi, nearly straight and very sharply pointed, measuring about 0·16 by 0·006 mm., with shaft only about 3·1 by 0·008 mm.

(3) Anatriænes; with short, stout, sharp-pointed cladi recurved approximately on arcs of a sphere, and very long, slender shaft tapering gradually to a fine hair; shaft about 5 by 0·012 mm., with cladi 0·033 by 0·01 mm. A few anadiænes and anamonænes also occur.

(4) Short-shafted orthotriænes; shaft usually much shorter than cladi (but I have seen one example in which it was longer), rounded off at the apex; cladi very variously developed, typically straight, regular, gradually and sharply pointed, measuring, say, about 0·37 by 0·029 mm., but very variable, often unequally developed, often irregularly bent or even contorted, or more or less completely aborted. Regular forms with straight or almost straight cladi are much more numerous than the others.

(5) Short, slender, hair-like oxea; measuring about 0·3 by 0·002 mm.; abundantly scattered in the choanosome, apparently absent from the ectosome.

(6) Slender, contort sigmata; about 0·0165 mm. in greatest length from bend to bend; very numerous, especially in the choanosome.

This variety is evidently nearly related to the Ceylon form, *Paratetilla bacca* var. *cineriformis*, but differs in its more robust growth, the much stronger development of the porocalices and the larger size of the spicules generally. The short, hair-like oxea are

reduced to vestiges in the Ceylon form and were not referred to in the original description thereof. The form of the porocalices and the manner in which they tend to become confluent, as well as the smaller size of the oxea, serve to differentiate this variety from the type of the species. The character of the porocalices also distinguishes it pretty sharply from *P. bacca* var. *violacea*.

Register Number, Locality, &c. LIX., Diego Garcia, 10.7.05, 10 fathoms.

Family **Haploscleridæ**.

Monaxonellid Sigmatotetraxonida in which sigmatose microscleres of various forms are typically present but never take the form of chelæ. The skeleton is reticulate and the fibre is typically neither plumose nor echinated. The megascleres are usually diactinal.

This family consists of sigmatotetraxonid sponges in which the tetractinellid megascleres have been entirely suppressed while the microscleres have not yet reached that stage of evolution which is represented by the chelæ of the Desmacidonidæ. The origin of the family from the Tetillidæ is not difficult to imagine, although no very satisfactory intermediate forms have yet been met with. The suppression, more or less complete, of the triænes is a well-known phenomenon amongst the Stellettidæ, and it is only reasonable to suppose that it occurs also amongst the Tetillids, in many of which, indeed, the oxea tend to dominate over the triænes. A greater difficulty is perhaps to be found in the character and arrangement of the oxea, for the typical tetillid oxea are very long, straight and radially arranged, while the typical oxea of the Haploscleridæ are short, slightly curved and arranged in a reticulate fashion. There are, however, some Tetillids in which oxea of a second kind make their appearance. These are short and may be slightly curved, and they occur irregularly scattered through the choanosome (*e.g.* in *Cinachyra vaccinata* n. sp. *q.v.* and in many other species of Cinachyra). I am inclined to think that it was by substitution of such oxea as these for the long, radially arranged oxea, accompanied by the suppression of the triænes, that the Gelliinæ, the most primitive sub-family of the Haploscleridæ, were derived from tetillid ancestors.

The experience which I have recently gained in dealing with the Astrotetraxonida with regard to the part played by the loss of spicules in the evolution of sponges has decided me to follow Topsent in removing the old groups Tedaniinæ and Desmacellinæ (but not the Hamacanthinæ) from the family Haploscleridæ. They are, I think, better regarded as what may be termed "lipochelous" Desmacidonidæ, *i.e.* Desmacidonidæ in which the chelæ have been suppressed. This leaves the Haploscleridæ a much more homogeneous group. The position of the Heteroxyinæ is more doubtful, but they seem too complex in structure to belong to this family and may also be removed for the time being to the Desmacidonidæ. The Merlinæ must follow the Hamacanthinæ, with which they seem to have distinct affinities.

Sub-family **Gelliinæ**.

Haploscleridæ with oxeote or strongylote megascleres and microscleres in the form of sigmata or toxa or microxea.

This sub-family certainly seems to form the natural starting point for the evolution of the monaxonellid Sigmatotetraxonida. The Renierinæ have apparently originated from

the Gelliinæ by loss of microscleres unaccompanied by any great development of spongin, the Chalininæ by loss of microscleres accompanied by strong spongin development, the Phlœodictyinæ by the development of the fistular processes and rind, and the Desmacidonidæ by evolution of the sigma into the remarkable chelate type of microsclere.

Genus Gellius Gray [1867 f].

Gelliinæ with little or no spongin, the main skeleton being formed by a reticulation of oxea.

11. *Gellius fibulatus* (Schmidt) var. *microsigma* Dendy.

(For literature and synonymy *vide* Dendy [1916 a].)

I refer to this variety a number of small specimens of irregular form from various localities. The spicular measurements are approximately as follows :—

R.N. liii. 5 a. Oxea 0·185 by 0·0065 mm.; sigmata 0·018 mm. from bend to bend.

R.N. liii. 12. Oxea 0·184 by 0·005 mm.; sigmata 0·01 mm. from bend to bend.

R.N. lvi. 4. Oxea 0·164 by 0·004 mm.; sigmata 0·01 mm. from bend to bend.

R.N. cxiii. 4. Oxea 0·2 by 0·008 mm.; sigmata 0·02 mm. from bend to bend.

R.N. cxiii. 6. Oxea 0·164 by 0·004 mm.; sigmata 0·02 mm. from bend to bend.

In view of the variation in spicular measurements it is doubtful whether this form can be distinguished even varietally from the European *Gellius fibulatus*.

Previously known Distribution of Species. Adriatic (Schmidt); North Atlantic (Topsent); Gulf of Manaar, Ceylon Seas (Carter, Dendy); Okhamandal (Dendy).

Register Numbers, Localities, &c. liii. 5 a, liii. 12, Coetivy; lvi. 4, Coin Peros; cxiii. 4, 6, Egmont Reef.

12. *Gellius flagellifer* Ridley and Dendy.

Gellius flagellifer Ridley and Dendy [1886, 1887].
Desmacella porosa Fristedt [1887].
Gellius flagellifer Lambe [1896].
Gellius flagellifer Topsent [1896 b].
Gellius flagellifer Lundbeck [1902].
Gellius porosus Lundbeck [1902].

I identify with this species a well-preserved specimen considerably larger than the "Challenger" type. It has the form of a flattened crust, presumably detached from some substratum, but with practically uninjured lower surface. It is convex above and concave below. The upper surface is rather uneven, coarsely granular and slightly shaggy in places. It bears a few small, scattered vents. The texture is compressible and elastic, but rather fragile. The colour in spirit is light greyish brown. The specimen measures about 55 by 50 by 10 mm. The skeleton reticulation is very lax and irregular though the spicules are rather crowded. There is a good deal more spongin present than in the type (in which there is a little), and certain of the spicular fibres (both primary and secondary) have quite a thick coating of it.

The oxea are a little shorter and stouter than in the type, measuring say about 0·37 by 0·02 mm., but varying a good deal in thickness and usually more slender. The flagelliform sigmata are closely similar to those of the type but the hook at the narrower end frequently has a slight outward curve which I have not observed in the latter. The ordinary sigmata call for no special comment.

I hardly think that Lundbeck is justified in maintaining Fristedt's *Desmacella porosa* as a distinct species and I prefer to follow Lambe in regarding it as a synonym of *G. flagellifer*, which is evidently a somewhat variable form. The distribution of the species seems to be almost cosmopolitan.

Previously known Distribution. Off Marion Island (Ridley and Dendy); Davis Strait (Fristedt); Atlantic coast of Canada (Lambe); Gulf of Gascoyne (Topsent); Iceland (Lundbeck).

Register Number, Locality, &c. VIII. 3, Saya de Malha, 6.9.05, C. 15, 55 fathoms.

13. *Gellius calyx* Ridley and Dendy var. *indica* nov.

Gellius calyx Ridley and Dendy [1886, 1887], not *Gellius calyx* Topsent [1892 c].

A single specimen from deep water at Saya de Malha may be regarded as representing a variety of this very elegant but little-known species, originally obtained by the "Challenger" from a depth of 600 fathoms off the mouth of the Rio de la Plata and, so far as I am aware, not met with since, for Topsent's supposed record has been shown by himself [1904 A] to be erroneous.

The "Sealark" specimen, like the type of the species, has very much the form of a crocus flower, but the transition from stalk to body is more gradual than in the type. The body is hollow and I think there can be little doubt that there was a single terminal osculum, but the upper part of the specimen is a good deal damaged. The stalk expands below into an attachment-plate, which seems to have run out into root-like processes. The total height of the specimen is about 45 mm. and the maximum diameter of the body 9 mm. The texture of the body is very soft and fragile, of the stalk stringy. The colour in alcohol is pale yellow.

The skeleton of the stalk consists principally of long fibres, composed of dense bundles of oxea, and these fibres extend throughout the body in the form of a loose reticulation with longitudinal meshes, in which numerous oxea are loosely scattered. The surface is so much macerated that I can say nothing about the dermal skeleton.

The oxea are long and slender, gradually and very sharply pointed; only slightly curved. They measure about 0·53 by 0·01 mm.

The sigmata are C-shaped, strongly curved, with sharply pointed extremities. They measure about 0·037 mm. from bend to bend, with a thickness in the middle of about 0·0027 mm.

This variety differs from the type of the species chiefly in the much more slender oxea and much larger sigmata. The sponge includes, as foreign bodies, numerous fragments of the skeleton of the hexactinellid *Aulocalyx serialis*, which was obtained from the same locality.

Previously known Distribution of the Species. Off the mouth of the Rio de la Plata, South Atlantic (Ridley and Dendy).

Register Number, Locality, &c. V. 3, Saya de Malha, 7.9.05, C. 20, 3—500 fathoms.

14. *Gellius toxius* Topsent.

Gellius toxius Topsent [1897 A].
Gellius toxius Thiele [1899].
Gellius toxius Hentschel [1912].

This species is represented in the collection by two specimens. One (CXIX. 6 A) is a small crust, only about 10 mm. in diameter, growing upon a fragment of coral in association with numerous other organisms. The skeleton is an isodictyal or sub-isodictyal reticulation of mostly single oxea cemented together by spongin at their apices. The oxea are slightly curved, fairly gradually and sharply pointed, and measure about 0·14 by 0·005 mm. There are also numerous much more slender forms of about the same length, possibly young. The microscleres are moderately stout toxa, not at all sharply angulated and about 0·05 mm. in length. The other specimen (CVI. 1 G) is also a small crust, growing upon a bivalve shell. It resembles the first very closely in skeleton arrangement and spiculation and calls for no further comment.

Previously known Distribution. Bay of Amboina (Topsent); Celebes (Thiele); Aru Islands (Hentschel).

Register Numbers, Localities, &c. CVI. 1 G, Amirante, 13.10.05, E. 16, 39 fathoms; CXIX. 6 A, Salomon.

15. *Gellius petrosioides* (Dendy).

Gelliodes petrosioides Dendy [1905].

There is a single specimen of this species in the collection. It is apparently only a fragment of a larger specimen and has the form of a somewhat flattened lobe, with broadly rounded margin, measuring about 47 by 30 by 15 mm. A fair number of rather small vents occur scattered over the surface, chiefly on one side. In skeleton arrangement and spiculation the specimen agrees very closely with the Ceylon type. The colour in spirit is rather light brown. The texture is hard but brittle.

It appears to me now that this species falls better in the genus Gellius than in Gelliodes, for spongin, if present at all, is quite inconspicuous. In the presence of distinct oscula the "Sealark" specimen resembles Topsent's [1892 C] *Gelliodes fayalensis* even more closely than does the type specimen, and future investigations may make it necessary to unite the two species. There appears, however, to be a good deal of difference in the form of the oxea, as figured, and I have seen none of the large "cellules sphéruleuses" which Topsent mentions.

Previously known Distribution. Ceylon Seas (Dendy).

Register Number, Locality, &c. XCVI. 2, Amirante, 13.10.05, E. 15, 39 fathoms.

Genus GELLIODES Ridley [1884 C].

Gelliinæ with much spongin, more or less completely enveloping, or even replacing, the megascleres and forming distinct fibres. Microscleres sigmata.

16. *Gelliodes carnosa* Dendy var. *laxa* nov.

(Plate **2**, fig. 1.)

Gelliodes carnosa Dendy [1889, 1905].

There are two spirit specimens of this very elegant variety in the collection, both from the same locality (Cargados Carajos) and possibly parts of the same sponge. The most perfectly preserved is represented in Plate **2**, fig. 1. It consists of a proliferous mass of slender, anastomosing tubes, with numerous short branches rising obliquely upwards from all over the sponge and each terminating in a circular vent. Each specimen measures about 85 by 40 mm.; the branches are about 4 mm. in diameter, the vents a little less. The texture (in spirit) is compressible and resilient, fairly tough; the colour light brown. There is a very similar dry specimen from Amirante.

The main skeleton is a sub-rectangularly meshed network of stout horny fibre, cored by the oxea. The dermal skeleton is an almost unispicular reticulation of oxea, held together and enveloped by a moderate amount of the pale-coloured spongin.

The oxea are slightly curved, gradually sharp-pointed at each end, measuring about 0·14 by 0·008 mm., but often more slender and sometimes a little stouter.

The sigmata are abundant; very slender; C-shaped or slightly contort; measuring about 0·02 mm. from bend to bend.

This variety differs from the typical form in the much less complete fusion of the tubular branches of which the sponge is composed.

Previously known Distribution of Species. Gulf of Manaar, Ceylon Seas (Dendy).

Register Numbers, Locality, &c. XLIV. 1, 2, Cargados Carajos, 31.8.05, B. 19, 28 fathoms; CXLVIII. Amirante.

Genus Toxochalina Ridley [1884 c].

Gelliinæ with much spongin, more or less completely enveloping, or even replacing, the megascleres and forming distinct fibres. Microscleres toxa.

17. *Toxochalina robusta* Ridley.

Toxochalina robusta Ridley [1884 c].
Toxochalina robusta Ridley and Dendy [1887].
Toxochalina robusta Dendy [1905].

There are three fine specimens of this species in the collection, all closely resembling one another, being composed of repent, anastomosing branches, with rather large scattered vents on the upper surface. The oxea are more gradually sharp-pointed than figured for the type, but I suspect that this feature is exaggerated in Ridley's figure.

Previously known Distribution. Port Jackson (Ridley); off Bahia (Ridley and Dendy); Gulf of Manaar, Ceylon Seas (Dendy).

Register Numbers, Localities, &c. LXXVI. 1, 2, Amirante, 9.10.05, E. 1, 29 fathoms; XCVIII. 1, Amirante, 9.10.05, E. 3, 25 fathoms.

Sub-family **Renierinæ**.

Haploscleridæ with oxeote or strongylote megascleres and in which the microscleres have entirely disappeared and little or no spongin is developed.

Genus Reniera Schmidt [1870].

Renierinæ in which the skeleton is composed of a close reticulation of typically single megascleres, each forming one side of a rectangular, triangular or polygonal mesh. Spicules short, oxeote or strongylote, usually united together at the ends only by spongin cement.

This genus has apparently been derived from Gellius by loss of the sigmata.

18. *Reniera semitubulosa* (Lamarck ?).

?Spongia semitubulosa Lamarck [1813].
?Halichondria semitubulosa Lieberkühn [1859].
?Reniera semitubulosa Schmidt [1862].
?Pellina semitubulosa Schmidt [1870].
Reniera semitubulosa Keller [1878].

This species is characterized by its branching habit, slender spicules and absence of spongin. The "Sealark" specimens, though in a fragmentary condition, agree so closely with Keller's description and figures, especially as regards the spicules, that there seems a reasonable degree of certainty as to their specific identity with the form examined by him, but whether or not that form was correctly identified as Lamarck's *Spongia semitubulosa* is perhaps more doubtful.

The "Sealark" material consists of sub-cylindrical branches, ranging from about 1·5 to about 7 mm. in diameter. The largest fragment is about 48 mm. in length and itself unbranched, other fragments are sparingly branched and one shows anastomosis. The surface is even and has a coarsely porous appearance; there is no separable dermal membrane. The texture is very soft and compressible, fragile. No vents are recognizable but some fragments contain rather wide exhalant canals running lengthwise, while others are solid. The colour in alcohol is very pale yellow.

The skeleton is weakly developed and consists of a sub-isodictyal reticulation of slender oxea, in which many feebly developed, loose, plurispicular, longitudinal fibres can be recognized. There is no special dermal skeleton and little if any spongin.

The spicules are slender oxea, slightly curved or bent in the middle, rather abruptly sharp-pointed. They measure about 0·164 by 0·004 mm.

Previously known Distribution. Adriatic (Lieberkühn, Schmidt, Keller).

Register Numbers, Localities, &c. LXIV., Diego Garcia, 9 fathoms, 10.7.05; LXVIII. 6, Lagoon, Diego, 10 fathoms, 12.7.05.

19. *Reniera rosea* (Bowerbank).

Isodictya rosea Bowerbank [1866, 1874].
Isodictya rosea Carter [1879 G].
Reniera rosea Ridley [1884 C].
Reniera rosea Topsent [1893].

Ridley and Topsent have already recorded this species from the Indian Ocean, a fact which encourages me in making the present identification. The "Sealark" specimens are, however, very fragmentary. They seem to have been irregularly massive, with occasional mammiform or digitiform processes. The vents, scattered on prominent parts of the sponge, measure about 4 mm. in diameter. Where uninjured the surface is covered by a very thin, transparent dermal membrane, containing the inhalant pores. The texture is compressible, very fragile and crumb-of-bread-like throughout. The colour in spirit is in most cases very pale yellow, in one specimen (R.N. XLVII. 7) light brown (but this is possibly due to staining by other sponges in the same jar).

The main skeleton is a close, sub-isodictyal reticulation of oxea. The meshes are triangular and for the most part unispicular, but they become very irregular in places and there are slight indications of the formation of multispicular lines. There is very little spongin.

The dermal membrane is not entirely devoid of skeleton, as one would conclude from Bowerbank's description, but there is a very imperfect unispicular reticulation of oxea.

The oxea are fairly stout, slightly curved, sharply and fairly gradually pointed. They measure about 0·155 by 0·008 mm., but, as usual in the genus Reniera, numerous much more slender forms also occur.

In spiculation this species agrees very closely with *Reniera tuberosa* n. sp., but is to be distinguished by its softer texture, paler colour and larger vents. The distinction between the two is very evident in the case of R.N. LXX. 1 and LXX. 1 A, the latter being a specimen of *Reniera rosea* encrusting the former, which is a specimen of *R. tuberosa*. Though so closely related the two specimens have failed even to adhere closely together.

Previously known Distribution. British Seas (Bowerbank); Kerguelen (Carter); Amirantes (Ridley); Seychelles (Topsent).

Register Numbers, Localities, &c. XLVII. 7, Praslin Reef; LXX. 1 A, 2, 3, Lagoon, Diego Garcia.

20. *Reniera cribriformis* Ridley [1884 c].

There is a somewhat damaged specimen from the Seychelles, attached to the test of an Ascidian, which in general form and spiculation agrees very closely with Ridley's description of the type specimen. It has the form of a very irregular, thin-walled sac, broadly attached below and with a few small scattered vents on the upper surface. The surface is granular rather than glabrous as described by Ridley, and the colour in spirit is pale yellow instead of "pale dull brown." The maximum diameter is about 20 mm. The skeleton is confused, without distinct primary and secondary lines or fibres. The spicules are slender oxea, ranging from sharply pointed to strongylote and measuring about 0·2 by 0·007 mm. These characters, taken in conjunction with the identity of habitat, convince me that this specimen really belongs to Ridley's species.

The species is evidently very closely related to *Reniera camerata*, and it may, I think, fairly be questioned whether the two ought to be kept distinct.

Previously known Distribution. Seychelles (Ridley).

Register Number, Locality, &c. CXXXII. 1, Seychelles, 20.10.05, F. 6, 44 fathoms.

21. *Reniera camerata* Ridley [1884 c].

I refer to this species a number of fragments from Salomon, consisting of thin, curved lamellæ freely anastomosing with one another, and of a pale yellow colour and fragile consistency. The outer surface is smooth and granular, the inner thickly pitted by the minute openings of exhalant canals.

The skeleton is sub-isodictyal, but very confused and lax. The spicules are often associated in loose bundles, but with no regularity. They are rather slender, slightly curved oxea, usually and often abruptly sharp-pointed; measuring up to about 0·22 by 0·008 mm. but varying much in thickness.

The "Sealark" material seems to differ from the types of the species in its rather larger oxea and in their less, probably much less, definite association in multispicular tracts or fibres, but I do not think that these differences can be regarded as amounting to specific distinction.

Previously known Distribution. Seychelles and Amirante (Ridley).

Register Number, Locality, &c. CXX. 5, Salomon, 10—14 fathoms.

22. *Reniera cribricutis* n. sp.

(Plate **3**, figs. 1 *a*, 1 *b*; Plate **12**, fig. 1.)

There are two specimens of this species in the collection (Plate **3**, figs. 1 *a*, 1 *b*), both from the same locality, of which R.N. LXXI. 10 A (fig. 1 *a*) may be regarded as the type. This specimen is irregularly sub-cylindrical, unbranched, broadly rounded off at each end. It has evidently grown horizontally and been attached along the greater part of one side to some smooth object. The length of the specimen is about 68 mm. and the average diameter about 15 mm. There are several large vents, each about 5 mm. in diameter, mostly on what was evidently the upper side of the sponge. They are rather shallow, but with cavernous walls owing to the numerous exhalant canals which open into them. Their margins are level with the general surface. The surface of the sponge is smooth, but appears distinctly reticulate even to the naked eye. This appearance is due to the presence of the very numerous, rounded or oval subdermal cavities, separated from one another by a network of trabeculæ formed by the choanosomal tissue. Each subdermal cavity is about 1 mm. in diameter and is covered over by a minutely reticulate, transparent dermal membrane pierced by the inhalant pores, each pore being about 0·24 mm. in diameter. The texture of the sponge (in spirit) is very soft and compressible, but resilient, and the colour light pinkish brown*.

The second specimen (fig. 1 *b*) is closely similar in general characters to the type, but is smaller and broken off short. It is incipiently divided into two very short, thick branches.

The main skeleton is a rather confused, sub-isodictyal reticulation of small oxea, with slender, plurispicular primary lines running at right angles to the surface. There are a great number of quite irregularly scattered spicules, especially in the deeper parts of the sponge. In many places the fibres, both primary and secondary, show a thick coating of spongin, but this is so pale in colour as to be readily overlooked at first sight. Beneath the surface the primary fibres break up into multispicular brushes of spicules with projecting apices.

A distinct dermal skeleton appears to be developed only in the thin dermal membrane which covers in the subdermal cavities, where it forms an irregular, rather wide-meshed reticulation of slender, plurispicular fibres, with no conspicuous spongin, echinated in places by tufts of projecting oxea.

The spicules are slender oxea (Plate **12**, fig. 1), slightly curved and gradually and sharply pointed at each end, measuring about 0·17 by 0·006 mm.; with numerous more slender forms.

* Possibly stained by an Iotrochota in the same jar.

This species is evidently intermediate between the genera Reniera and Chalina, and might, with almost equal propriety, be included in either. It is closely related to *Reniera topsenti* Thiele [1905], a South American species which I recently [1916 A] recorded also from Okhamandal on the Indian coast, but differs in the greater amount of spongin and in the distinct dermal reticulation of spicular fibre.

Register Number, Locality, &c. LXXI. 10 A, B, Amirante, 17.10.05, E. 21, 30 fathoms.

23. *Reniera tuberosa* n. sp.

(Plate **3**, fig. 2; Plate **12**, fig. 2.)

There are a considerable number of specimens and pieces of this sponge from Saya de Malha, all closely resembling one another in general appearance. The largest (R.N. VII. 3 A) may be regarded as the type of the species (Plate **3**, fig. 2). It is very irregularly tuberous and has apparently lain at the bottom without any broad attachment. It is elongated and, with the addition of a fragment which has probably been broken off from it, measures about 85 mm. in length, while the maximum diameter of the transverse section varies from about 18 to about 40 mm. The surface is smooth but extremely uneven, and has a finely porous appearance under a pocket-lens. About a dozen small vents are scattered singly and quite irregularly over the surface; they are about 1·5 mm. in diameter and vary much in depth. The inhalant pores are scattered in the thin, translucent dermal membrane which occupies the meshes of the dermal reticulation.

The colour in spirit ranges from dull brownish yellow to light brown. The texture is firm, compact and incompressible, but friable.

The main skeleton is extraordinarily dense and confused, forming an almost solid mass of spicules between the moderately wide branches of the canal system. There is no distinctly separable dermal membrane, and in vertical section the dermal skeleton cannot be distinguished from the main skeleton, but a tangential surface section shows a close reticulation of multispicular fibre with small rounded meshes only about a spicule's length in diameter. There appears to be spongin.

The spicules are moderately stout, slightly curved oxea (Plate **12**, fig. 2), sharply and fairly gradually pointed at each end, measuring about 0·15 by 0·008 mm. Numerous smaller, and especially more slender forms occur, possibly young.

This species appears to be fairly well distinguished by its external form, the extraordinarily dense and confused character of the main skeleton and the nature of the dermal reticulation.

Register Numbers, Localities, &c. VII. 3 (a considerable number of specimens, including 3 A); VIII. 6*, Saya de Malha, 6.9.05, C. 15, 55 fathoms; LXX. 1, Lagoon, Diego Garcia, 8.7.05.

24. *Reniera tufoides* n. sp.

(Plate **2**, figs. 2, 2 *a*; Plate **12**, fig. 3.)

This species (Plate **2**, figs. 2, 2 *a*) is represented in the collection by two pieces which may possibly have formed parts of the same specimen. They are both flattened, cake-like and presumably encrusting, with slightly convex upper surface. There is a rather thick,

* This specimen is stained purple owing to another sponge in the same jar.

separable dermal membrane, which for the most part lies closely upon the choanosome but sometimes overlies tubular canals (? both exhalant and inhalant) which in some places run parallel to and just beneath the surface while in others they approach the surface at right angles. Where it covers these subdermal canals the dermal membrane has a distinctly reticulate appearance when viewed under a pocket-lens. Occasionally, also, this part of the dermal membrane is pierced by a rounded aperture which looks like an osculum but which may be due simply to injury. It seems probable that in life the oscula are represented by sieve-membranes. Internally the sponge has much the appearance of some specimens of pumice-stone and is pierced by innumerable, ramifying, sub-cylindrical canals of very varying diameter, some of which, as already stated, lie immediately beneath the dermal membrane. The largest piece measures about 85 by 45 by 22 mm. The colour in alcohol is pale greyish yellow; the texture hard and incompressible, but friable.

The main skeleton is a rather loose, sub-isodictyal reticulation of oxea, the sides of the meshes being sometimes unispicular and sometimes plurispicular; it contains no distinct fibres. The dermal membrane contains a similar reticulation of similar spicules arranged tangentially, and is further strengthened by a coarse, irregular, subdermal reticulation of stout multispicular fibre, at any rate in places. I have not been able to detect any spongin.

The oxea (Plate **12**, fig. 3) are moderately stout, slightly curved and fairly gradually sharp-pointed, measuring about 0·27 by 0·0123 mm.

This well-characterized species closely resembles *Reniera tufa* Ridley and Dendy [1886, 1887] both in general appearance and skeletal characters. It differs in the presence of the subdermal reticulation of fibre, in the considerably larger oxea and probably in having the vents covered over by the dermal membrane. Its hardness and the character of the skeleton are such as almost to justify its inclusion in the genus Petrosia, which cannot be sharply separated from Reniera.

Register Number, Locality, &c. XCIII., Amirante, 14.10.05, E 14, 280 fathoms.

25. *Reniera ligniformis* n. sp.

(Plate **4**, fig. 1; Plate **12**, fig. 4.)

This curious and well-characterized species is represented in the collection by a number of fragments which probably all belong to the same specimen. It is still possible to fit some of them together, but in the case of others there is some doubt of their exact position. The following description of the external form is taken from the best restoration which it was possible to make (Plate **4**, fig. 1) and cannot be far from accurate. The sponge seems to have grown erect, in a tree-like fashion, with a slightly expanded base of attachment. From this base arise a main stem and a smaller stem, side by side. The smaller stem (if correctly identified amongst the pieces) was only about 30 mm. in height and 10 mm. in greatest diameter (near the top). The larger one, irregularly cylindrical but somewhat angular in form, rises to a height of 65 mm. without branching and then divides into three branches of very unequal length, coming off from one another at acute angles so that all three ascend nearly vertically. The longest reaches a total height, measured from the base, of 140 mm. (the total height of the sponge). All these branches are somewhat angular and also somewhat flattened, and they are widest at or near the extremity, which is broadly

rounded off. The largest has a maximum width of 18 mm. (at the end). The vents are rather small, about 2 mm. in diameter, but quite conspicuous, and scattered singly over the sides of the stem and branches without any definite arrangement. The surface of the sponge is smooth and even subglabrous (in spirit) where uninjured. It exhibits a very characteristic pattern, due to the presence of very numerous narrow, close-set, usually longitudinal grooves (subdermal cavities) covered over by a very thin, transparent dermal membrane. These grooves are separated from one another by intervals of about 1·5 mm.; while they themselves are only about 0·5 mm. wide. In some places, especially on the main stem, they run almost parallel with one another, with only occasional cross anastomoses; in other places they form a network. The delicate dermal membrane which covers them is reduced to a meshwork by the numerous inhalant pores. The texture of the sponge internally is crumb-of-bread-like. The whole sponge is fairly compact and rigid but very brittle and friable. The colour in spirit is light brown.

The main skeleton is a dense and confused, sub-isodictyal reticulation of small oxea, with a slight indication of slender primary lines running lengthwise and curving outwards to the surface. Between the subdermal cavities the more superficially placed spicules are disposed more or less at right angles to the surface, with slightly projecting apices, but there is no special dermal skeleton and over the subdermal cavities the dermal membrane is practically devoid of spicules.

The spicules are rather slender oxea (Plate **12**, fig. 4); slightly curved and fairly gradually sharp-pointed; measuring about 0·14 by 0·0055 mm., with numerous more slender forms.

The specific name "ligniformis" has been given to this species in allusion to the curious resemblance, both in colour and texture, which the sponge (in its present condition) bears to water-worn fragments of driftwood.

Register Number, Locality, &c. LXI., Lagoon, Diego Garcia, 8.7.05.

Genus Petrosia Vosmaer [1887 A*].

Renierinæ of hard or even stony texture, owing to the density of the skeleton, which is composed of an irregular reticulation of oxeote or strongylote megascleres (usually short and thick), packed close together, sometimes in stout fibres.

26. *Petrosia seychellensis* n. sp.

(Plate **2**, figs. 3, 4; Plate **12**, figs. 5 *a*, 5 *b*.)

This well-characterized species is represented in the collection by two good specimens, of which I propose to regard R.N. CXXVIII. 1 as the type. This specimen (Plate **2**, fig. 3) is massive, irregularly rounded, and attached to a mass of calcareous conglomerate by a broad base. It is rendered partially clathrous by a wide, irregular cavity which completely pierces it and opens on two sides. This cavity is now the abode of a bivalved mollusc, whose presence may have had something to do with its formation. The general surface is smooth and minutely granular. The vents are represented by five groups of small openings, each opening only about 1 mm. in diameter, and the largest group containing about 20 of

* Name published in 1885.

them closely crowded together. The smallest group is surrounded by a raised and slightly contracted margin, forming a shallow cloacal cavity in the floor of which the vents open; some of the other groups may have exhibited a similar condition during life, the margin being now rubbed away. The specimen measures about 60 mm. in height by 54 mm. in greatest breadth. The texture is hard, compact and incompressible, the colour in alcohol is light brownish yellow. The second specimen (R.N. LXXII. 3) is about twice the size of the former and much more irregular in shape (Plate **2**, fig. 4). It is also slightly clathrous, a condition which may be partly due to the presence of parasitic barnacles. The vents are grouped as before but none of the groups have (now, at any rate) raised margins. In places there is a very distinctly recognizable, minutely reticulate dermal membrane, overlying well-developed subdermal cavities (a similar structure is recognizable in places, but less conspicuous, in the type specimen). The texture is again hard and incompressible and the colour in spirit is pale yellow.

The main skeleton is a very dense, confused reticulation of the stout megascleres, intermingled with a smaller number of the slender kind. The dermal skeleton is a confused reticulation of both kinds of spicule arranged tangentially, but with a larger proportion of the slender forms (especially in R.N. LXXII. 3, where the latter preponderate heavily).

Spicules:—(1) Stout, slightly curved oxea (Plate **12**, fig. 5 *a*), tapering fairly gradually towards the two ends but almost invariably more or less blunted at both; occasionally becoming stylote or strongylote; size about 0·43 by 0·026 mm.; (2) slender, slightly curved, gradually and very sharply pointed oxea (fig. 5 *b*), measuring, say, about 0·25 by 0·006 mm. but very variable in size and connected by intermediates with the larger kind. The above measurements are taken from the type specimen. In R.N. LXXII. 3 the large spicules are a good deal stouter, frequently as much as 0·04 mm. in diameter, but of about the same length.

This species seems to be well characterized by its external features and by the differentiation of its oxea into two fairly distinct categories. The latter character might be thought to justify its inclusion in the genus Spongosorites, but it is only an exaggeration of what may occur in other species of Petrosia, in which the more slender spicules are commonly regarded, probably quite rightly, as merely young forms.

Register Numbers, Localities, &c. R.N. LXXII. 3, Amirante, 11.10.05, E. 10, 22—85 fathoms; CXXVIII. 1, Seychelles, 20.10.05, F. 9, 37 fathoms.

27. *Petrosia mammiformis* n. sp.

(Plate **12**, fig. 6.)

Sponge consisting of short, thick-walled, tubular processes, rising from a basal crust and each ending in a wide, circular vent. The specimens, which all come from the same locality, are all more or less imperfect. R.N. CXXIV. 2 consists of an irregular crust, attached to a mass of nullipore, from which one or more processes have apparently been broken off. R.N. CXXIV. 3 is a complete tubular process which has perhaps been detached from the preceding. R.N. CXXII. 2 and CXXII. 3 are also short tubular processes, which may have been detached from the same specimen. The basal crust measures only about 21 mm. in maximum diameter and is very irregular in thickness. The largest mammiform process is

16 mm. in length and 8 mm. in thickness in the middle, with walls about 2 mm. thick and terminal osculum about 3 mm. in diameter. The texture is not very hard and decidedly friable, easily crushing under pressure. The surface is smooth and appears faintly reticulate when viewed under a pocket-lens. The colour in alcohol is light brown.

The main skeleton is a close reticulation of stout, loose, irregular, multispicular fibre, with a fairly distinct differentiation into primary and secondary lines, and many spicules loosely scattered between the fibres. The dermal skeleton is a close reticulation of stout multispicular fibre, with rounded meshes in which lie the inhalant pores; the meshes being hardly a spicule's length in diameter.

The spicules are short, stout oxea (Plate **12**, fig. 6) of very varying sizes, irregularly mingled together in both dermal and main skeleton. They are usually sharply and rather abruptly pointed, but not hastate, and often more or less bent or curved, sometimes quite strongly. The largest measure about 0·3 by 0·02 mm., the smallest about 0·08 by 0·012 mm., and numerous intermediates occur. There seems to be but little tendency towards blunting of one or both ends of the spicule, such as is so commonly met with in some species of the genus. A few slender oxea occur which may perhaps be regarded as young.

This species is evidently closely related to Schmidt's (? Nardo's) *Petrosia* (*Reniera ?*) *dura* from the Adriatic, Carter's *Reniera crassa* (*Petrosia crassa* Lundbeck 1902) from the North Atlantic, Thiele's *P. imperforata* from Celebes, and my own *P. densissima* from Ceylon, especially as regards spiculation, but differs in its characteristic external form and in the arrangement of the vents.

Register Numbers, Locality, &c. CXXII. 2, 3, CXXIV. 2, 3, Salomon, 3.7.05, 75 fathoms.

Genus Halichondria Fleming [1828].

Renierinæ (?) in which the skeleton consists of a confused reticulation of long and slender oxea (or strongyla) with little or no spongin; the spicules sometimes associated in ill-defined bands or fibres.

This is an unsatisfactory genus, which, as I have already pointed out [1905], may be of polyphyletic origin. The long, slender oxea suggest a possible origin from "epipolasid" Astrotetraxonida, such as Asteropus, rather than from sigmatotetraxonid ancestors.

28. *Halichondria panicea* Johnston, var.

(For literature, synonymy, &c., *vide* Ridley and Dendy [1887] and Dendy [1905].)

The single specimen which I refer to this widely distributed species is irregularly rounded, somewhat tuberous in form; about 56 mm. in length, 37 mm. in greatest breadth and 20 mm. in greatest thickness. The texture is unusually compact, slightly compressible and resilient, but rather friable. The surface is smooth, minutely granular, without any separable dermal membrane. There are two vents on what was presumably the upper surface, each about 2·5 mm. in diameter. The main skeleton is a confused reticulation of slender oxea without any distinct fibres, though the spicules tend to arrange themselves in loose wisps, the ends of which in places project more or less vertically from the surface, while deeper down in the sponge other loose wisps cross these at right angles. In other parts there is a dense dermal skeleton of tangentially placed oxea, crossing one another in all

directions without forming a regular network, and here the projecting spicules are absent. The spicules are slender oxea, slightly curved and fairly gradually sharp-pointed at each end; they measure about 0·6 by 0·014 mm.

Previously known Distribution of the Species. Almost cosmopolitan.

Register Number, Locality, &c. XLVII. 1, Praslin Reef.

29. *Halichondria retiderma* n. sp.

(Plate **2**, fig. 5; Plate **12**, figs. 7 *a*, 7 *b*.)

The single specimen (Plate **2**, fig. 5) is massively lobose, undivided, and probably grew erect. It has been broken off below and is now about 80 mm. high by 55 mm. in greatest breadth and 35 mm. in greatest thickness, narrowing irregularly to a rounded summit. The surface is uneven, and covered everywhere by a thin, transparent, minutely reticulate dermal membrane, overlying extensive but shallow subdermal cavities and also covering over the ends of the wide exhalant canals, so that there are no visible vents. The dermal membrane is easily separable from the underlying choanosome, to which it is attached by numerous short, slender pillars of spicular fibre. The texture throughout is rather soft and very fragile, and cavernous owing to the presence of wide, cylindrical exhalant canals running vertically towards the summit of the sponge. The thin, transparent dermal membrane is of course perforated by numerous pores. The colour in spirit is yellowish grey.

The main skeleton is a very confused reticulation of rather slender oxea, for the most part scattered singly, but occasionally aggregated in loose wisps. Towards the surface they become aggregated in the ill-defined fibres which form the columns supporting the dermal membrane. The dermal skeleton is an irregular reticulation of tangentially disposed oxea, either of single spicules or of loose wisps. There is very little spongin.

The spicules are rather slender, slightly curved oxea (Plate **12**, fig. 7 *a*), fairly gradually and sharply pointed at each end; measuring about 0·4 by 0·012 mm. when fully grown. An occasional stylote spicule (fig. 7 *b*) occurs amongst the oxea, of about the same dimensions.

This species is well-characterized by its very distinct, reticulate dermal membrane, with a well-developed dermal skeleton, and by the concealment of the oscula thereby. It might be included in Schmidt's genus Pellina [1870], but I do not see how the retention of that genus can be justified in view of the very varying extent to which a separable dermal membrane may be developed in different species.

Register Number, Locality, &c. XCVII. 1, Amirante, 18.10.05, E. 23, 16 fathoms.

30. *Halichondria nigra* n. sp.

(Plate **12**, fig. 8.)

This species is represented in the collection by four fragments, two of which evidently fit together to form a tolerably complete specimen, which I regard as the type of the species, and from which the following description is taken. The sponge has apparently not been attached to the sea-bottom but has grown partially around the slender, cylindrical stem of some plant. It is irregularly cylindrical in form, with a very slight tendency to become branched: about 83 mm. in length and 27 mm. in maximum diameter. The surface is rather uneven, but subglabrous, with a rather thick, separable dermal membrane. The

vents are irregularly scattered on the broader end of the sponge, which was probably uppermost in life. They are more or less prominent, widely open, and up to 8 mm. in maximum diameter. The texture is compressible and fairly resilient, but friable and rather cavernous, with wide, cylindrical canals penetrating the interior and showing a strong tendency to run lengthwise just beneath the dermal membrane. The colour throughout is dark grey, almost black.

The skeleton arrangement is very confused, but shows loose, slender, multispicular primary and secondary fibres arranged in squarish meshes of very various sizes, the spaces between the fibres being crowded with irregularly scattered spicules. The dermal skeleton is a confused reticulation of tangentially placed oxea crossing one another in all directions, and doubtless with the inhalant pores scattered in the intervals, though these are hardly discernible now. A fair amount of spongin is present both in the dermal and in the main skeleton, but not as a continuous investment of the spicular fibre.

The spicules are slender, slightly curved oxea (Plate **12**, fig. 8), usually more or less blunted at the extremities, and measuring about 0·22 by 0·0082 mm. Numerous much more slender forms, gradually sharp-pointed at each end, also occur; these are probably young.

The colour of the sponge is due to numerous minute, brown pigment granules, scattered through the dermal membrane and in the interior of the sponge.

This species is perhaps nearly related to my *Reniera pigmentifera* from Ceylon [1905], but differs considerably in several respects.

Register Numbers, Localities, &c. XLVII. 9, Praslin Reef (a small fragment); LIII. 5, Coetivy (the type specimen and another piece of irregular shape).

31. *Halichondria aplysinoides* n. sp.

(Plate **3**, figs. 3, 4, 5; Plate **12**, fig. 9.)

The specimen (R.N. LXXVII. 2) which I regard as the type of this species is massive and compact, with evenly rounded contours. It is slightly compressed in a vertical plane and measures about 120 mm. in height by 103 mm. in greatest breadth and 70 mm. in greatest thickness (Plate **3**, fig. 3). A considerable amount of very coarse calcareous débris is attached to the surface in places, especially at the much constricted base of attachment. Otherwise the surface is clean, faintly nodulated, and more or less covered with a minute reticulation of raised ridges, very variously developed in different parts. There is a large, shallow vent, receiving the openings of four large exhalant canals. This vent is situated on one side of the sponge, a little below the rounded summit; it is about 7 mm. in diameter and its margin is level with the general surface. Another much smaller, double vent occurs just below the summit on the other side, and possibly there may be a few more small ones not easily distinguishable. The inhalant pores are scattered in the interstices of the dermal reticulation. The colour (in spirit) is dark brown over the greater part of the surface, but this dark colour is confined to a thin superficial layer and the sponge is much lighter internally. The texture is compact, slightly compressible and resilient.

The skeleton is a rather dense and quite irregular reticulation of long oxea, occasionally associated in loose wisps but without any definite fibres. Stained sections show that these spicules are often cemented together, where they come into contact with one another, by

a considerable quantity of spongin. There is no true dermal skeleton, though the portions of the main skeleton lying just beneath the surface might sometimes be mistaken for such. Here and there the surface is slightly hispid from the projection of the ends of some of the oxea.

The oxea (Plate **12**, fig. 9) are very like those of *Halichondria panicea*; long, rather slender, slightly curved and gradually sharp-pointed at each end. They vary considerably in size, measuring about 1·0 by 0·03 mm. when fully grown.

The histological structure of this sponge exhibits features of considerable interest, whereby it may readily be distinguished from such species as *Halichondria panicea*. The ectosome is composed of a thin fibrous (or fibrillar) layer (about 0·04 mm. thick) overlying a very thick layer of collenchyma. The fibrous layer is seen in tangential sections to be broken up into the characteristic dermal reticulation, with rounded meshes, by the presence of numerous irregular subdermal cavities roofed over each by a thin, cribriform dermal membrane. The collenchymatous layer is penetrated by the irregular subdermal cavities and cannot be sharply separated from the underlying choanosome, in which the larger canals are surrounded by a thick layer of similar tissue. The pigment is almost confined to the ectosome and is chiefly developed in the fibrous layer.

The flagellate chambers are confined to the irregular, granular-looking areas between the collenchymatous invasions of the choanosome. They are about 0·016 mm. in diameter. I have not been able to make out how they communicate with the rest of the canal system.

The most characteristic feature of this species appears to be the dermal reticulation, composed of a network of fibrillated bands of varying diameter, which gives to the surface an appearance resembling that of species of Aplysina.

There are a considerable number of specimens in the collection exhibiting this character and also agreeing pretty closely with the type of the species in skeleton arrangement and spiculation, while exhibiting a great deal of variation as regards external form and, to a less extent, colour. The most extreme variation is seen in R.N. LXXVIII. 7 (Plate **3**, fig. 4) and R.N. CXXVIII. 3, which exhibit a slightly branched, digitate mode of growth, with branches averaging only about 10 mm. in diameter and with small scattered vents. The spicules are also decidedly smaller than in the type and show a stronger tendency to associate themselves in fibres, and were it not for the existence of specimens intermediate in form—some of them very irregular—I should have felt strongly inclined to place the two specimens referred to in a distinct species.

R.N. LIII. 6, which is an irregularly massive specimen, shows the tendency towards the development of loose spicular fibres very strongly, the fibres mostly running towards the surface. The same is true of R.N. CXXV. 1. R.N. XLII. 3 (Plate **3**, fig. 5) and R.N. CXXV. 1 are infested by parasitic barnacles, deeply imbedded in the sponge and giving rise to a false appearance of numerous vents.

Register Numbers, Localities, &c. XLII. 3, Cargados Carajos, 30.8.05, B. 9, 30 fathoms; LIII. 1, 6, Coetivy; LXXI. 3, 4, Amirante, 17.10.05, E. 21, 30 fathoms; LXXVII. 2, Cargados, 30 fathoms; LXXVIII. 4, 7, Cargados Carajos, 28.3.05, B. 2, 30 fathoms; XCVII. 2, Amirante, 18.10.05, E. 23, 16 fathoms; CX. 1, Egmont Reef; CXXV. 1, 23.8.05, > 100 fathoms; CXXVIII. 3, Seychelles, 20.10.05, F. 9, 37 fathoms.

32. *Halichondria tenuiramosa* nom. n.

Halichondria reticulata Baer [1905]. (Not *Halichondria reticulata* Lieberkühn [1859].)
Halichondria reticulata Dendy [1916 A].

A fine specimen (?all one) of this curious species, from Diego Garcia, appears to be very typical both in skeleton and histological features, and the external form differs from that of the Okhamandal specimens only in the greater preponderance of long, slender, comparatively straight branches and their less frequent anastomosis. The species appears to be a characteristic but not very common constituent of the sponge-fauna of the Indian Ocean.

Previously known Distribution. Zanzibar (Baer); Okhamandal (Dendy).

Register Number, Locality, &c. LXXXIII. 2, Barachois, Diego Garcia, 9.7.05.

Sub-family **Chalininæ**.

Haplosclerida with oxeote or strongylote megascleres and without microscleres. Skeleton a network of more or less strongly developed horny fibre cored by spicules and often with spicules scattered between the fibres.

It may well be doubted whether this large and apparently homogeneous sub-family is really a monophyletic group, for the chalinine condition may, with equal probability, be derived either from a renierine ancestry by addition of spongin or from a gelliine ancestry (Gelliodes or Toxochalina) by suppression of microscleres. On the other hand the suppression of megascleres also in certain chalinine sponges seems to have given rise to pseudoceratose forms such as Chalinopsilla Lendenfeld [1888].

Genus Pachychalina Schmidt [1868].

Chalininæ of various external form, lobose or digitate, but not tubular; with stout skeleton fibres containing very numerous spicules arranged multiserially.

33. *Pachychalina subcylindrica* Dendy [1905].

(Plate **8**, fig. 1.)

This species is represented in the collection by three pieces, which are perhaps all parts of the same specimen. The sponge consists of long, repent branches (Plate **8**, fig. 1), averaging about 8 mm. in diameter and somewhat angular in transverse section, the upper surface forming a more or less prominent ridge on which the conspicuous vents are arranged uniserially. The branches show some tendency to subdivide dichotomously and to anastomose with one another. The vents vary greatly in diameter, up to about 3 mm., and the larger ones have prominent margins. They lead out of deep, vertical oscular tubes. The largest piece is about 165 mm. in length. The surface is smooth and subglabrous, but minutely reticulate to the naked eye owing to the subdermal cavities showing through the dermal membrane. It has in many places a sandy appearance due to the inclusion of much foreign matter. The texture is rather hard and little compressible, somewhat fragile.

The main skeleton is a rather close but very irregular reticulation of stout, multispicular fibres, with much foreign matter both in and between the fibres and a fair amount of spongin.

Many spicules are scattered irregularly between the fibres. The dermal skeleton is a close-meshed network of similar multispicular fibre, with single spicules scattered tangentially in the meshes.

The spicules are slightly curved, gradually sharp-pointed oxea, measuring about 0·16 by 0·006 mm., but frequently much more slender.

The "Sealark" specimen appears to differ from the Ceylon types chiefly in the regular uniserial arrangement of the vents. The types also contain a considerable amount of foreign matter and probably more spongin than I originally supposed.

The species is evidently nearly related to the Australian *Pachychalina melior* Ridley and Dendy [1887].

Previously known Distribution. Ceylon Seas (Dendy).

Register Number, Locality, &c. XX. 1, Providence, 4.10.05, D. 3, 29 fathoms.

Genus Chalina Grant [1861].

Chalininæ of various external form; not tubular. Skeleton reticulation typically rectangular; fibres usually slender, with much spongin and few but usually well developed spicules.

34. *Chalina confusa* n. sp.

(Plate **3**, fig. 6; Plate **12**, fig. 10.)

Sponge (Plate **3**, fig. 6) erect or pendent (?), sparingly branched, attached by an irregular, spreading base to a mass of calcareous débris. Branches long and slender, separating from one another at very acute angles, so that they lie almost parallel; diameter from about 2 to about 4 mm. Total length of specimen about 130 mm. Surface minutely rough and porous-looking. Vents numerous, but small and rather inconspicuous, arranged in longitudinal series. Texture rather soft, compressible and resilient, but fairly tough. Colour in spirit dark brown throughout, owing to the presence of numerous minute, scattered pigment granules and of abundant, rather dark-coloured spongin.

The skeleton is extraordinarily confused, owing chiefly to the very numerous loose spicules scattered irregularly between the fibres. A longitudinal section shows numerous sub-parallel, slender primary fibres, running in the main lengthwise but curving outwards towards the surface. These fibres are about 0·02 mm. in diameter. They contain a core of well-developed spicules, usually arranged in several series, surrounded by a thick coating of spongin, spongin and spicules being present in about equal proportions. They are connected crosswise by secondary fibres of the same character, but more slender and usually with only a single spicule in the axis. The intervals between the fibres are densely crowded with scattered spicules. There is no special dermal skeleton, and the outer part of the main skeleton becomes very irregular towards the surface.

The spicules are slightly curved oxea (Plate **12**, fig. 10), usually very sharply but rather abruptly pointed, measuring when full grown about 0·15 by 0·006 mm. As usual, numerous much more slender forms occur, probably young.

This is a rather curious and well-characterized species, intermediate in skeletal characters between Chalina and Halichondria, with the external form of a Chalina.

Register Number, Locality, &c. LXXV. 3, Amirante, 11.10.05, E. 11, 25—30 fathoms.

Genus Ceraochalina Lendenfeld [1887].

Chalininæ of various external form; not tubular. Texture hard, owing to the great thickness of the skeleton fibres, in which the spongin is very strongly developed and the spicules much reduced in size and sometimes also in number.

35. *Ceraochalina reticutis* Dendy [1905] var. *salomonensis* nov.

The single specimen in the collection is an irregularly sub-cylindrical, somewhat nodose sponge, probably repent in life. It seems likely that a branch has been broken off, but in its present condition it measures about 100 mm. in length by 10 mm. in average diameter. The surface is smooth but uneven, and beautifully reticulate under a pocket lens. The vents are numerous, about 2 mm. in diameter, sometimes with prominent margins and mostly arranged in longitudinal series. The texture is compressible and resilient, but stiff and tough. The colour is now light brown.

The main skeleton is a reticulation of stout, amber-coloured horny fibre, with triangular or sub-rectangular meshes sub-divided in places by an irregular secondary network of very slender fibres springing from the stout ones. The stout fibres average, say, about 0·14 mm. in diameter, the slender ones only about 0·025 mm. (The secondary reticulation was not mentioned in the description of the type of the species, but I find that it occurs there also.) Any of the fibres may contain vestigial spicules or may be without them, the numbers in which these occur varying greatly in different parts.

The dermal skeleton is a singularly beautiful reticulation of stout and slender horny fibre; the stout fibres, similar to those of the main skeleton, being arranged in triangular meshes, radiating from nodes which mark the ends of primary fibres of the main skeleton, and the slender fibres, of very various diameter, forming a secondary, small-meshed network between the stout fibres. Here again the number of spicules in the fibres varies greatly in different parts of the sponge, as also does the degree to which the spicules are developed individually, *i.e.* their diameter. In the stout fibres they are often so slender as to be barely recognizable, in the slender fibres they are stouter and there is usually one to each side of the small meshes.

The spicules are slender strongyla, usually slightly curved, about 0·078 mm. in length and up to about 0·002 mm. in diameter. In the interior of the sponge they occur scattered in the soft tissues between the fibres as well as in the fibres themselves.

The chief distinguishing character of this variety as compared with the type of the species seems to be the strongylote instead of oxeote character of the spicules.

Previously known Distribution of the Species. Gulf of Manaar (Dendy).

Register Number, Locality, &c. CXXI. 2, Salomon, 15 fathoms, 10.6.05.

36. *Ceraochalina differentiata* n. sp.

(Plate **3**, fig. 7; Plate **12**, fig. 11.)

This species is represented in the collection by two pieces, probably parts of the same specimen. The sponge (Plate **3**, fig. 7) is composed of short, irregularly sub-cylindrical, somewhat nodose branches, with fragments of calcareous débris attached here and there; it

was probably repent on the sea-bottom in life. The largest piece is 52 mm. long and varies from about 8 to about 14 mm. in diameter. The smaller piece is apparently a detached branch. The surface is smooth and even glabrous. The numerous small, rounded subdermal cavities of varying size show clearly through the transparent dermal membrane, which itself appears minutely and very evenly punctate under a pocket lens. The vents, varying in diameter up to about 4 mm., are rather numerous and mostly scattered on what was evidently the upper surface of the sponge. Each leads out of a deep or shallow cloacal tube, whose walls are perforated by numerous apertures. The thin margins of the vents are only slightly prominent. The colour in spirit is light greyish brown, the texture rather soft, compressible and resilient.

The main skeleton is characterized by the sharp differentiation between primary and secondary fibres. The former run towards the surface in sub-parallel lines, bifurcating occasionally (but more frequently near the surface) at very acute angles. Each consists of a well-developed spicular core, about three spicules' width in diameter, surrounded by a thick coating of spongin ; the total diameter of the fibre being only about 0·0287 mm., while the intervals between the fibres (except near the points of bifurcation) average about 0·2 mm. These primary fibres are connected by secondaries, which in places simply run across between the primaries like the rungs of a ladder, while in other places they form an irregular network. The secondary fibres are for the most part entirely devoid of spicules, but here and there a single spicule occurs in the axis. They vary in diameter from about 0·004 to about 0·025 mm.

The dermal skeleton is a close-meshed reticulation of horny fibre, with only occasional spicules in the axis of the fibre. The meshes are usually quadrangular and about 0·085 mm. in width, while the fibres range in thickness from about 0·004 to about 0·03 mm. The fibres are echinated at frequent intervals by small bundles of outwardly projecting oxea, to which is due the minutely punctate appearance of the surface.

The spicules are rather slender, very slightly curved oxea (Plate **12**, fig. 11), sharply and rather abruptly pointed, measuring about 0·08 by 0·003 mm. A considerable number, especially more slender forms, occur between the fibres.

This species may be closely related to my *Ceraochalina retiarmata* from Ceylon [1905], but differs considerably both in external form and in details of skeleton arrangement.

Register Number, Locality, &c. CVII. 1, Amirante, 14.10.05, E. 17, 12—18 fathoms.

Sub-family **Phlœodictyinæ**.

Haploscleridæ in which the ectosome forms a more or less sharply differentiated rind enclosing the often pulpy choanosome and produced into hollow tubular processes or fistulæ. The megascleres, both of the ectosome and of the choanosome, are typical oxea (or strongyla), for the most part lying tangentially in the dermal layer and forming a reticulation, either fibrous or otherwise, in the deeper parts. This reticulation is usually concentrated to form a subdermal bast-like network of spicular fibre in the ectosome. Microscleres may be present in the form of sigmata or toxa but there are no chelæ.

In my report on Professor Herdman's Ceylon sponges [1905] I included in this subfamily the genera Phlœodictyon, Oceanapia, Histoderma (=Cœlosphæra), Sideroderma (Sidero-

dermella) and Amphiastrella, thus associating those genera which possess chelæ with those which do not, and those which possess diactinal megascleres in the form of tylota (or their derivatives) with those which have ordinary oxea or strongyla. Lundbeck [1910] dissents from this view and gives good reason for considering that the resemblance of such genera as Cœlosphæra, Siderodermella and Amphiastrella, to Phlœodictyon and Oceanapia is due merely to convergence. I am inclined to think now that Lundbeck is right and I therefore propose to include the former, together with certain obviously related forms, in a section of the Ectyoninæ, for which the name Cœlosphæreæ would seem to be the most appropriate, while retaining the sub-family Phlœodictyinæ for the latter.

As to Schmidt's genus Rhizochalina [1870], in spite of the fact that Lundbeck [1902], who has examined the original types of Schmidt's species, has come to the conclusion that they are Chalininæ, I do not feel at all convinced that they are not very closely related to Carter's Phlœodictyon, and consider that Schmidt's genus should at any rate be included in the same sub-family. Lundbeck, indeed, rejects the sub-family altogether, and, while relegating Rhizochalina to the Chalininæ, places Phlœodictyon amongst the Renierinæ and Oceanapia amongst the Gelliinæ. I see no need for such a drastic proceeding and as the sub-family is certainly a very useful one I propose to retain it in the sense indicated above.

Genus Oceanapia Norman [1868].

Phlœodictyinæ with microscleres in the form of sigmata or toxa, or both.

37. *Oceanapia toxophila* n. sp.

(Plate **8**, fig. 2; Plate **12**, figs. 12 *a*—*c*.)

There are three pieces of this sponge in the collection. Two of them (R.N. xx. 2), which were found in the same jar, almost certainly belong together and form practically an entire specimen (Plate **8**, fig. 2), which may be regarded as the type of the species. The third piece (R.N. xxi. 3 a) comes from the same locality (Providence) but was obtained at a different time and no doubt represents another specimen.

The type specimen consists of an irregularly fusiform, tuberous body, about 27 mm. long by 11 mm. in maximum diameter, tapering off at each end into a hollow cylindrical process, or fistula, about 4 mm. in diameter. One of these fistulæ is quite short, only about 6 mm. long, and terminates irregularly, with a subterminal opening. It has apparently been damaged during life, possibly by rolling on the sea-bottom, for there is no indication of any attachment of the sponge to the substratum. The other is broken off short at a distance of about 9 mm. from the body, but the detached portion, already referred to as one of the three pieces, is about 55 mm. in length, of nearly uniform diameter throughout (about 4 mm.), but with an uneven, irregular surface and frayed out at what was evidently the distal end. The general surface ranges from finely granular, or even minutely hispid, to subglabrous. On the body are visible a number of subdermal canals, visible through the thin membrane which roofs them over. Some of these converge towards a group of very small vents, by which they open. The cavity of the longer fistula is continued for a long distance into the body, deeply penetrating the choanosome and giving off (or receiving ?)

numerous small canals in its course. The cavity of the smaller fistula, on the other hand, runs into the body close beneath the rind, where it branches into subdermal canals. The differentiation into rind (ectosome) and medulla (choanosome) is sharply marked but the choanosome is firm and compact and the ectosome (about 0·5 mm. thick) is closely adherent to it except in the region of the subdermal canals. In the fistulæ the ectosome alone is developed, forming the wall of the tube (about 0·7 mm. thick), and the whole fistula is stiff and rigid and rather brittle. The specimen has acquired a slight purple tinge from a specimen of Iotrochota in the same jar, otherwise it would doubtless be light yellowish brown in colour. The ectosome, including the fistula-wall, has a characteristic translucent appearance as compared with the opaque choanosome. Throughout the sponge occur a good many dark brown pigment granules, sparsely scattered in irregular groups (probably pigment-cells).

The main (choanosomal) skeleton is a very dense feltwork of oxea, not collected into fibres at all but interlacing with one another singly in all directions.

The ectosomal skeleton is rather peculiar. On the outside there is a thin dermal layer formed by a not very dense feltwork of tangentially disposed oxea. Beneath this is a layer, about 0·5 mm. thick, composed of a loose, sub-isodictyal reticulation of, for the most part, single oxea. In the fistula wall we find a similar arrangement of dermal and subdermal skeleton, with the addition of a large number of very stout longitudinal bands of multispicular fibre in the subdermal layer. These fibres are about 0·17 mm. thick. They occasionally branch and anastomose and evidently represent the so-called "bast layer." They are very feebly represented in the ectosome of the body.

Megascleres. Slightly curved oxea (Plate **12**, fig. 12 *a*), tapering more or less gradually to usually blunted extremities, size about 0·3 by 0·012 mm. Sharp-pointed forms seem to occur chiefly in the choanosome, they are perhaps immature.

Microscleres. (1) Sigmata (fig. 12 *b*); slender, C-shaped or slightly contort; varying up to about 0·0164 mm. in length from bend to bend.

(2) Toxa (fig. 12 *c*) with short, straight, usually slender arms, diverging from one another sharply at an angle of about 135° and only slightly recurved at the apices; measuring up to about 0·057 mm. in a straight line from apex to apex but ranging down to a very small size.

Neither toxa nor sigmata can be said to be very abundant but they are quite sufficiently so to make it certain that they belong to the sponge, especially as they occur also in R.N. XXI. 3 A. In both specimens I have seen one or two minute amphidiscs but these are undoubtedly foreign and derived from specimens of Iotrochota in the same bottles.

The second specimen (R.N. XXI. 3 A) is a cylindrical fragment in a bad state of preservation. It is about 48 mm. long and 14 mm. in diameter. One end is broken off short; the other divides into two branches, one very short and with a wide and apparently natural opening at the end; the other may have been longer but has been frayed away almost completely, leaving an irregular opening. The interior of the sponge is divided into two or three wide longitudinal canals, one of which terminates in the opening at the end of the short branch. The colour in spirit is light brown. The spiculation agrees closely with that of the type.

This seems to be a very distinct species. I know of no other Phlœodictyine which

possesses toxa and the blunting of the ends of the oxea and the arrangement of the ectosomal skeleton also seem to be very characteristic. R.N. XXI. 3 A was associated in the same jar with two fistulæ of *Phlœodictyon* (*fistulosum*?) with which it was at first confounded, but they are quite easily distinguished on microscopical examination.

Register Numbers, Localities, &c. XX. 2, Providence, 4.10.05, D. 3, 29 fathoms; XXI. 3 A, Providence, 3.10.05, D. 1, 39 fathoms.

Genus PHLŒODICTYON Carter [1882 c].

Phlœodictyinæ without microscleres.

I am still doubtful whether this genus can be satisfactorily separated from Rhizochalina Schmidt [1870], but the differentiation of the fistulæ in Rhizochalina into two distinct groups, ascending and descending, even if there is no generic difference in skeletal characters, which remains uncertain, may perhaps serve as a means of distinction.

It is obvious, on the other hand, that Phlœodictyon has just as much claim to be separated from Oceanapia as Reniera has to be separated from Gellius, for it seems almost certain that Reniera and Phlœodictyon have been derived respectively from Gellius and Oceanapia by loss of the microscleres; and as it is not improbable that this loss has taken place independently in several species of each genus it may well be that Reniera and Phlœodictyon are of polyphyletic origin.

38. *Phlœodictyon seychellense* n. sp.

(Plate **8**, fig. 3; Plate **12**, fig. 13 *a*—*b*.)

Sponge (Plate **8**, fig. 3) massive (? encrusting), with rounded surface giving off numerous rather short fistulæ. Surface of body and fistulæ alike smooth and glabrous. The fistulæ average about 35 mm. in length and vary greatly in diameter, from about 5 to about 20 mm. Some of the smaller ones end blindly but these appear to be merely young stages of the larger ones, each of which terminates in a wide vent. The walls of the fistulæ are very thin and flaccid and the cavity is partially sub-divided internally by irregular longitudinal septa. The body generally is covered with a thin rind which easily peels off as a "dermal membrane." Internally it is very soft, spongy and friable, and penetrated by numerous cylindrical canals, about 3 or 4 mm. in diameter, which run into the fistulæ, sometimes many into a single fistula. The larger of the two specimens (R.N. CXXIX. 1) appears to be a fragment torn off from a large sub-spherical sponge. It measures about 120 mm. in height, 75 mm. in breadth and up to 35 mm. in thickness. It has a pale orange colour in spirit and the spirit containing it is deeply tinged with orange, and it seems probable that this colour is proper to the sponge. The second specimen (R.N. LI. 2) is closely similar but smaller, and of a pale grey colour without any trace of yellow.

The skeleton in the interior of the body consists of a very loose, irregular, wide-meshed network of multispicular fibre averaging about 0·016 mm. in diameter. The fibres are compact but there is no conspicuous spongin and very numerous loose spicules are scattered in the soft ground-substance between them. To the naked eye the reticulation of spicular fibres looks like a loose network of fine hairs inter-penetrating the soft choanosome. Immediately beneath the surface lies an irregular bast-like reticulation of similar spicular fibre

which separates readily from the underlying main skeleton and thus comes away with the true dermal membrane when the latter is peeled off. Outside this, in the dermal membrane itself, is a fairly close feltwork of single spicules lying tangentially in approximately a single layer. The skeleton of the walls of the fistulæ also consists of dermal and subdermal layers and exactly resembles that of the "rind."

Spicules. Slightly curved oxea (Plate **12**, fig. 13 *a—b*) sharply and fairly gradually pointed at each end, sometimes hastate, measuring about 0·18 by 0·0082 mm.

This species seems to come near to *Pellina eusiphonia* Ridley [1884 c] from Port Darwin, and certainly suggests a close relationship between the genus Phlœodictyon and the Renierinæ. It should also be compared with my own *Oceanapia mollis* from near Port Phillip Heads [1895], from which it differs chiefly in the absence of sigmata and the stronger development of spicular fibres in the main skeleton, and with Topsent's *Oceanapia fragilis* from Amboina [1897 A].

Register Numbers, Localities, &c. LI. 2, Praslin Reef; CXXIX. 1, Seychelles, 20.10.05, F. 2, 31 fathoms.

39. *Phlœodictyon porosum* n. sp.

(Plate **8**, fig. 4; Plate **12**, fig. 14.)

The single specimen (Plate **8**, fig. 4) is cylindrical, truncated at right angles above and attached obliquely below to a mass of coral, the surface of attachment being very extensive. The upper, truncated surface is slightly depressed, with raised and rounded margin, sub-circular in outline. It is covered by a rather thick and fragile, pore-bearing dermal membrane, resembling, in its present condition, damp blotting paper, and easily peeling off. It is smooth, but finely granular and rather uneven, and bears no fistulæ. This surface may evidently be regarded as a single very large pore-area (? inhalant or exhalant). The side of the cylinder bears a large number of cylindrical fistulæ, arising at considerable intervals from one another and standing out more or less at right angles from the surface. Most of these have been broken off quite short, leaving circular openings, and the remainder are much damaged. They are rather thin-walled and there are clear indications that they were sometimes branched. Some of them seem to have terminated blindly, probably in porous areas, others may have been open, but there is no real evidence of this. They average about 6 mm. in diameter and the longest remaining is 28 mm. in length. The wall of the fistula measures up to about 1 mm. in thickness. Between the bases of the fistulæ the surface of the sponge is smooth and has the appearance of being covered by a thin, slightly wrinkled cuticle, which can easily be peeled off in shreds, and is really a translucent, spicule-bearing dermal membrane. The total height of the specimen, on the longest side, is 100 mm.; on the shortest side, opposite to this, only 44 mm. The diameter at the upper, truncated end, is 65 mm. The texture is rather firm but compressible and resilient; fairly compact and fibrous internally, but with wide canals leading in from the fistulæ and smaller ones terminating below the dermal membrane of the pore-area. Colour in spirit very dark grey, almost black; due to the presence of an immense number of pigment cells filled with black granules, which occur scattered abundantly throughout the sponge.

The skeleton of the body consists of a very irregular reticulation of coarse multispicular fibre, together with numerous loosely scattered spicules. The reticulation is fairly close, and the fibres, usually about 0·085 to 0·17 mm. in diameter, contain a large proportion of pale-coloured spongin. There is no differentiated subdermal reticulation distinguishable from the deeper skeleton. The dermal skeleton is a thin but fairly well-developed feltwork of oxea, lying tangentially in the thin dermal membrane.

The skeleton of the fistula wall is arranged in the same way except that, owing to the hollow character of the fistula, the main skeleton is reduced to a coarse subdermal reticulation of multispicular fibre.

In the large pore-area (and possibly also at the closed ends of the fistulæ) the dermal skeleton is arranged differently, forming a close reticulation with small rounded meshes (about 0·086 mm. in diameter) containing small groups of pores. The spicular reticulation is very irregular and is echinated by numerous spicules projecting from it more or less at right angles.

Spicules. Slightly curved oxea (Plate **12**, fig. 14), gradually or abruptly sharp-pointed; varying greatly in size, up to about 0·2 by 0·01 mm. The different sizes are much intermingled, the larger chiefly in the fibres of the main skeleton and the smaller in the intervening ground substance and in the dermal skeleton.

This is a very remarkable species and I know of nothing already described that comes at all near it.

Register Number, Locality, &c. LXXVII. 4, Cargados, 30 fathoms.

40. *Phlœodictyon fistulosum* (Bowerbank).

(For References and Synonymy *vide* Dendy [1905].)

There is no complete specimen of this common species in the collection, but a number of fistulæ, large and small, branched and unbranched, from various localities. The largest measures 106 mm. in length by 18 mm. in maximum diameter and is unbranched and open at each end. Another, which is practically perfect and slightly branched at the distal end, measures 100 mm. in length with a maximum diameter of 8 mm.; a small portion of the body of the sponge is attached to its basal end.

Previously known Distribution. West Australia (Bowerbank); Arafura Sea (Ridley, Hentschel); S.W. of New Guinea (Ridley and Dendy); Amboina (Topsent); Gulf of Manaar (Carter); Ceylon (Dendy); ? Ternate (Thiele); Azores (Ridley and Dendy, Topsent); ? off Bahia (Ridley and Dendy).

Register Numbers, Localities, &c. XLII. 8, Cargados Carajos, 30.8.05, B. 9, 30 fathoms; CXXVIII. 4, 5, 6, CXXXIII. 8, Seychelles, 20.10.05, F. 9, 37 fathoms; ? XXI. 3 B, C, Providence, 3.10.05, D. 1, 39 fathoms.

41. *Phlœodictyon incrustatum* n. sp.

(Plate **12**, fig. 15.)

This species is represented in the collection by five fistulæ, all from Egmont Reef and very possibly from the same specimen. The lower portions of all the fistulæ except the smallest, which has apparently been broken off short, are encrusted with very coarse sand,

small nullipore nodules, &c.; clearly indicating that the body of the sponge was buried in similar débris and left behind when the fistulæ were collected, for all the fistulæ have evidently been broken off at the bottom. The fistulæ are of two kinds; three of them terminate each in a wide, sphinctrate vent; the other two end blindly and probably bear inhalant pores. One of the latter shows an incipient branching at the extremity; the remainder are quite unbranched. The three vent-bearing fistulæ are considerably larger than the others and all of about the same size, the largest being about 74 mm. in length by 12 mm. in average diameter. The walls of all the fistulæ are rather thin (about 0·5 mm.) and the cavities of the vent-bearing ones are more or less subdivided by longitudinal septa. The surface is finely granular and the colour in spirit dark brown.

The skeleton of the wall consists of a not very dense dermal feltwork of scattered oxea, lying tangentially and crossing one another in all directions. This is backed by a rather close-meshed reticulation of very stout spicular fibre, in which the multispicular fibres range up to 0·17 mm. in diameter. A few spicules project more or less at right angles from the surface and give it a minutely hispid character.

The soft tissues which form the septa in the interior of the fistulæ contain loosely scattered oxea, often lying parallel with one another in long tracts, perhaps sometimes forming spicular fibres.

Spicules. Oxea (Plate **12**, fig. 15); slightly curved, fairly gradually sharp-pointed; measuring about 0·21 by 0·0085 mm.

Though closely resembling it in skeleton arrangement and spiculation this species seems to be really quite distinct from *Phlœodictyon fistulosum*, which has a well rounded body almost if not quite free from the substratum and not encrusted with débris. There are probably also differences in the character of the fistulæ, and the dark brown colour of our species may also prove distinctive. It probably comes nearer to my *Phlœodictyon* (*Oceanapia*) *phillipense* [1895] but has much larger spicules and again differs in its dark colour.

Register Numbers, Locality, &c. CX. 2, CXIII. 5, Egmont Reef.

42. *Phlœodictyon polysiphonia* n. sp.

(Plate **8**, fig. 5; Plate **12**, fig. 16.)

The sponge (Plate **8**, fig. 5) consists of a mass of slender, thin-walled tubes or fistulæ rising vertically and close side-by-side from a common base. The tubes run approximately parallel to one another, anastomosing pretty freely and branching to a slight extent. Most, at any rate, of them are now open at the extremity, but the ends are a good deal damaged and some of them may have been closed in life. The diameter of the tubes is about 2 to 3 mm. and the length of the longest about 45 mm. The body of the sponge, which has mostly been left behind, seems to have been much mixed up with the very coarse sand upon which it grew; apparently it was enveloped, at any rate partially, in a thin rind, portions of which still appear as a continuation of the fistula-walls. The tubes are fairly stiff but flexible and resilient. The colour in spirit (after formalin) is very pale grey, nearly white. There are altogether about fifty of these tubes, partly adhering together, with fragments of the body, and partly broken away from one another.

The skeleton in the body of the sponge is a dense, confused mass of slender oxea,

occasionally collected in rather slender fibres. In the fistula-wall there is a bast-like subdermal layer of multispicular fibres about 0·04 mm. in diameter, arranged longitudinally but anastomosing with one another very obliquely to form a network with greatly elongated meshes. Outside this is a dermal layer composed of a loose feltwork of single spicules arranged tangentially.

Spicules. Slender, slightly curved oxea (Plate **12**, fig. 16), fairly gradually sharp-pointed at the ends and measuring about 0·14 by 0·004 mm.

This species is distinguished by the slenderness of the fistulæ, their great number and the way in which they are arranged, and by the small size of the spicules. It is unfortunate that the material does not show more clearly the character of the body. The specimen was originally preserved in formalin, which may account to some extent for its damaged condition.

Register Number, Locality, &c. LXXXIII. 1, Barachois, Diego Garcia, 9.7.05.

Sub-family **Merliinæ.**

Haploscleridæ with a calcareous basal skeleton perforated by crypts which are occupied by extensions of the choanosome. Siliceous skeleton composed of bundles of tylostyles, with microscleres in the form of clavidiscs, to which trichites (raphides) and sigmata may be added.

Were it not for the existence of the enigmatical basal skeleton, the genus Merlia, for which this sub-family was proposed, might perhaps be included in the Hamacanthinæ, along with Vomerula and Hamacantha, for the characteristic clavidisc has much in common with the diancistron and there seems to be no reason for regarding either as an aberrant chelate form. The Melananchora spicule, on the other hand, for which Topsent has proposed the name "Spherancistron" and which has also been compared with the clavidisc, is evidently, as originally shown by Carter, a peculiar type of chela characterized by meeting and fusion of the opposite teeth of a tridentate isochela, and it seems to bear no close resemblance to the clavidisc.

Genus Merlia Kirkpatrick (1908 d).

With the characters of the sub-family.

For a detailed account of this genus the reader is referred to Kirkpatrick's important memoir in the *Quarterly Journal of Microscopical Science* [1911]. Inasmuch as the genus is a very remarkable one, of which the only known recent examples were found at Porto Santos, near Madeira, the discovery even of isolated spicules in the "Sealark" collection assumes considerable interest. It is probable that it has a very wide range of distribution and is of considerable antiquity, for the highly characteristic "clavidisc" was described and figured by Hinde and Holmes [1892] from the lower tertiary strata of Oamaru in New Zealand many years before the genus Merlia was described, but this earlier work, in which the spicule is described under the name *Melonanchora morlandi*, appears to have been overlooked by more recent observers.

43. *Merlia* sp.

(Plate **12**, fig. 18.)

In a boiled-out preparation of the spicules of *Tedania reticulata* (R.N. cxx. 4), from Salomon, there occurs a very beautiful and perfect example of a clavidisc (Plate **12**, fig. 18), the remarkable and very characteristic microsclere of the genus Merlia. Another example, broken but quite unmistakable, occurs in a similar preparation of the spicules of *Hymedesmia lævissima* (R.N. cxxv. 6) from Mauritius. Both specimens agree very closely with the corresponding spicules of *Merlia normani* Kirkpatrick, except for their considerably larger size. The perfect example from Salomon might be described as diamond-shaped, with broadly rounded angles, so far as its general outline is concerned. It measures 0·0656 mm. in length and 0·041 mm. in breadth in the middle, while the clavidiscs of *Merlia normani* measure only about 0·045 by 0·03 mm. (Kirkpatrick). The clavidiscs of *Merlia normani* (which I have examined carefully) vary much in outline and are usually rather irregular, but diamond-shaped specimens are by no means uncommon. The broken example from Mauritius is evidently a fragment (about half, including one end) of a spicule closely resembling the Salomon specimen and very little inferior to it in size (the fragment is actually 0·0574 mm. long). It seems possible that these isolated spicules may represent an Indian Ocean species different from *Merlia normani*, and it is to be hoped that future collectors in this region will keep a careful look-out for this very remarkable and interesting sponge.

Family **Desmacidonidæ**.

Monaxonellid Sigmatotetraxonida with typically reticulate skeleton, often with much spongin. Megascleres usually, but not always, asymmetrically ended. Typical microscleres chelæ of various forms, which are, however, frequently suppressed. Without discorhabds or derivatives thereof.

The very remarkable and characteristic chelæ of this group may be regarded as derived from sigmata by the addition of teeth (flukes) or palms at the two ends. In development the typical chela passes through a sigma-like stage and amongst the great variety of fully-formed chelæ some are to be found which depart comparatively little from the condition of typical sigmata*. The teeth or palms evidently arise as outgrowths from the curved ends of the shaft, as shown clearly in some of Lundbeck's beautiful figures†.

The diversity of form exhibited by the chelæ in different species appears to be almost endless, but I cannot agree with Levinsen and some other recent writers in drawing a sharp distinction between "chelæ" and "ancoræ." However useful these terms may be for purposes of description, the characters in question have to be used with great discretion when dealing with taxonomic problems, and to insist invariably upon the generic separation of species possessing "chelæ" and "ancoræ" respectively appears to me undesirable. We shall have occasion to return to this question later on in dealing with the "Sealark" material. In the meantime I may point out that the old and well-recognized distinction between tridentate and palmate chelæ, though by no means absolute, seems to be of greater taxonomic value.

* *Vide* Lundbeck's figure of the peculiar chelæ of *Hymedesmia mucronata* [1910, Pl. x, fig. 3*d*].

† *Vide* Lundbeck [1905, Pl. xv, fig. 2*g* and Pl. xvi, figs. 2*e* and 3*f*].

There is now abundant evidence that a large number of species in various subdivisions of the Desmacidonidæ have suffered reduction in their spiculation by loss of the chelæ. I propose to term such species "lipochelous." It is a phenomenon precisely analogous to the loss of the tetract megascleres whereby the monaxonellid condition has arisen from the tetractinellid. It is of course not always easy to determine the affinities of such forms, but other characters generally remain which afford sufficient indications of relationship.

Exactly as in the case of the loss of triænes in the "epipolasid" Stellettidæ, however, a very difficult taxonomic problem arises in connection with these lipochelous forms. A considerable number of genera have been described which may now be recognized as consisting merely of lipochelous species derived from other, chela-bearing genera, and the question is how far the presence or absence of chelæ can be used as a generic character. I shall have occasion to point out presently that the genus Biemna may be regarded as consisting of lipochelous species of Mycale, that Desmacella bears the same relation to Esperella, that Aulospongus and Microciona, Crella and Yvesia, form similar pairs, and so on. In other cases lipochelous species have been left in the same genus as chela-bearing forms, as, for example, in Hymedesmia (*q.v.*). It is impossible, in the present state of our knowledge, to be consistent in this matter, and each case has to be treated on its merits and a decision arrived at in accordance with what seems most likely to assist in the ultimate phylogenetic arrangement of the species. Premature conclusions as to genetic relationships are, however, likely to do more harm than judicious conservatism.

The loss of the chelæ is, again, exactly comparable to the loss of the sigmata in the Renierinæ and Chalininæ, but it would by no means be expedient in this case to associate all the lipochelous forms together in one or two artificial sub-families. It is the absence of other distinguishing characters that renders such a course unavoidable, in the present state of our knowledge, when dealing with the Haploscleridæ.

The evolution of the Desmacidonidæ has been accompanied by the conversion, in the first instance, of the primitive, symmetrical, diactinal type of megasclere into an unsymmetrical, monactinal type (stylote or tylostylote), presumably by suppression, more or less complete, of one of the two primitive rays. This *seems* to have resulted from a definite orientation of the spicule in the sponge, whereby the growth of one end is impeded as compared with that of the other. In many cases, however, and notably in the Myxilleæ and Cœlosphæreæ, the symmetrical condition has been more or less completely resumed by certain of the megascleres. This seems to take place when the spicule comes to lie tangentially in the dermal membrane, where its two ends are exposed to similar conditions, and it appears that such originally dermal spicules may migrate into the choanosome while still retaining their symmetrical or sub-symmetrical form (*e.g.* Plumohalichondria). Such spicules are sometimes referred to as diactinal, or secondarily diactinal, but it would perhaps be better to speak of them, and of all similar spicules of doubtful origin, simply as symmetrical or sub-symmetrical, without committing oneself to any opinion as to the number of primitive rays actually represented*. It must always be remembered that the form of a megasclere may be largely dependent upon its position in the sponge; not necessarily its final position, but that which it occupies during its growth. In most

* In many cases it is convenient to use the terms "oxeote" and "stylote" without any theoretical implication.

Desmacidonidæ the stylote (or even tylostylote) condition appears to have become fixed and constant for the megascleres of the main skeleton, but in the genus Guitarra it is hard to draw a distinction between styli and oxea, the one form passing into the other.

The Desmacidonidæ constitute one of the largest and most important families of sponges and for systematic purposes it is very desirable to subdivide it. One of the earliest attempts to do this was that of Mr Ridley and myself in the Report on the "Challenger" Monaxonida, published thirty years ago. A dual subdivision into Esperellinæ and Ectyoninæ was then proposed, but at the same time it was recognized that the line of demarcation between the two sub-families could not be satisfactorily defined. Topsent subsequently proposed an intermediate group, to be known as the Dendoricinæ. On the ground that the generic name Mycale has priority over Esperella, the sub-family Mycalinæ now replaces the Esperellinæ in the writings of most spongologists, while for a similar reason the name Myxillinæ is used in preference to Dendoricinæ. Lundbeck, however [1905], regards the Myxilleæ, as he terms them, as a subdivision of the Mycalinæ.

As I shall show later on, there is no necessity to abandon the genus Esperella altogether in favour of Mycale and I therefore retain the sub-family Esperellinæ as proposed in the "Challenger" Report on the Monaxonida. I also retain the sub-family Ectyoninæ in the old sense. A very careful consideration of the facts, however, has convinced me that the Myxilline sponges, although, as Topsent pointed out, they form a very natural group, are not intermediate between the Esperellinæ and Ectyoninæ; on the contrary their characteristic symmetrical or sub-symmetrical dermal spicules and tridentate isochelæ indicate that they are a highly specialized group of Ectyoninæ, amongst which I accordingly place them as a special section under the name Myxilleæ.

The so-called Axinellidæ have hitherto, by general consent, been kept apart from the Desmacidonidæ. They are, however, evidently, as at present understood, a very heterogeneous assemblage, amongst which the more typical genera are very possibly derived from Ectyonine ancestors. It seems desirable therefore to reduce this group to the rank of a sub-family of the Desmacidonidæ, which sub-family may at once be rendered more homogeneous by the removal of certain genera.

Sub-family **Esperellinæ**.

Desmacidonidæ without echinating megascleres and without specially differentiated, symmetrically or subsymmetrically ended dermal spicules.

The Esperellinæ are evidently less specialized sponges than the Ectyoninæ and it is amongst this sub-family that the link between the Desmacidonidæ and the Haploscleridæ, if any such exists, is likely to be found. As a matter of fact we have in the genus Isodictya a group of species which really do not differ greatly from species of Gellius. The megascleres are all oxea, evidently of a primitive diactinal type, and without constant orientation, and there is nothing in the arrangement of the skeleton to differentiate the two genera. This being so it is important to inquire into the character of the chelæ. These are palmate isochelæ of a rather peculiar form, which may clearly be regarded as sigmata, provided, in certain regions, with lateral fimbriæ, just as diancistra may be regarded as sigmata with fimbriæ developed in another plane. It is a very significant fact

that Bowerbank, in describing the isochelæ (anchorates) of *Isodictya palmata*, the type of the genus, clearly regarded them as modified sigmata (bihamates). He says [1866 B, p. 312] "The middle portion of the shaft is curved outward in the usual manner, and the two extremities are bent into hooks like a simple bihamate spiculum....But this flexuous bihamate form has a further development; fimbrications appear on the sides of the shaft, especially towards the hamate extremities," &c.

The Esperellinæ are but poorly represented in the "Sealark" collection.

Section Mycaleæ.

Typical megascleres stylote or tylostylote. Chelæ with well-developed palms, but not placochelæ.

Genus Mycale Gray [1867 F].

Megascleres smooth styli or tylostyli. Microscleres palmate anisochelæ, sigmata and trichodragmata. No toxa.

The type of this genus is Bowerbank's *Hymeniacidon* (*Raphiodesma*) *lingua*. I accept the genus for species whose spiculation conforms to that of the type, but this acceptance does not necessarily involve the rejection of the genera *Ægagropila* and *Esperella*, for the type of the former (*Halichondria ægagropila* Johnst. = *Desmacidon ægagropila* Bk.) possesses toxa but no trichodragmata, while that of the latter (*Spongia contarenii* Martens = *Esperia typica* Nardo) possesses neither trichodragmata nor toxa.

The number of species included in the genus Mycale, as employed by recent authors, renders it desirable to have some method of grouping them in smaller genera. This is a case where, especially in view of historical considerations, the presence or absence of toxa and trichodragmata may well be utilized for generic distinctions.

44. *Mycale crassissima* (Dendy).

(Plate **5**, fig. 1.)

Esperella crassissima Dendy [1905]. *Mycale crassissima* Hentschel [1912].

There are in the collection four specimens of this species which agree very closely with the Ceylon type both in external form and skeletal characters. The largest specimen (R.N. LXXVII. 5) is massive, rounded, rising up into digitiform processes each bearing a conspicuous vent at its apex (Plate **5**, fig. 1). Its colour now is light, dirty brown, but this may be due to staining by other specimens in the same tin. It measures about 70 mm. in height by 48 mm. in greatest breadth. In its lower portion there are clear indications of a coarsely clathrous structure of the entire mass, a character which is more strongly marked in R.N. XI. 1. The three other specimens are much smaller and white (or nearly so) in spirit.

Hentschel [1912] rightly mentions a small palmate anisochela as a constituent of the spiculation, 0·012—0·015 mm. in length. These are abundant in the "Sealark" specimens, usually about 0·0164 mm. long.

In my original description I spoke of small palmate "isochelæ" as being numerous in the dermal membrane. This was a slip and should read "anisochelæ." I have re-examined

the type and can find no isochelæ. In one of the "Sealark" specimens, however, (CXXXIV. 3) I have seen some three or four isochelæ of about the same size as the small anisochelae. I have found none in the other specimens and doubt much whether they can be regarded as normal constituents of the spiculation.

In all the "Sealark" specimens the tylostyli are pointed at the apex, as in the type.

Previously known Distribution. Ceylon (Dendy); Aru Islands, Arafura Sea (Hentschel).

Register Numbers, Localities, &c. XI. 1, S. de Malha, 7.9.05, C. 19, 29 fathoms; XXIX. 2, Cargados Carajos, 3.10.05, B. 24, 30 fathoms; LXXVII. 5, Cargados, 30 fathoms; CXXXIV. 3, Seychelles, 20.10.05, F. 9, 37 fathoms.

Genus Biemna Gray [1867 F].

Lipochelous Mycaleæ with stylote or tylostylote megascleres and sigmata and raphides (or trichodragmata) for microscleres, to which toxa may be added.

The type species of this genus is Bowerbank's *Desmacidon peachii* [1866, 1874]. A reference to the description and figures of this species in the *Monograph of British Sponges* shows that in addition to sigmata it also possesses raphides or trichites, probably originally grouped in trichodragmata. The following passages refer to these spicules and leave no doubt as to their nature.

"Tension spicula, acerate, varying greatly in length, and of extreme tenuity, dispersed, exceedingly numerous." "The tension spicula are thickly felted together on its surface [*i.e.* the surface of the interstitial membranes]; they are very minute and slender, and their length is frequently not more than a third or a fourth of that of one of the bihamate retentive spicula. Among the short slender tension spicula there are frequently other acerate spicula of three or four times their length, and these are still more slender than the shorter ones."

Three years later [1870] Schmidt proposed his genus Desmacella, the type species of which is *Desmacella pumilio*, a species with tylostylote megascleres and sigmata only for microscleres. At the same time he described a second species, *viz. Desmacella vagabunda*, with two so-called varieties, one of which has, in addition to the tylostyles and sigmata, "feine umspitzige Nadeln" which have since been shown to be toxa[1]. Finally Schmidt included in his genus Desmacella, Bowerbank's *Hymedesmia johnsoni*, for which, on account of its remarkable diancistra, Gray [1867 F] had already proposed the genus *Hamacantha*.

An extraordinary confusion has arisen with regard to these genera in the writings of subsequent authors. Vosmaer, in his monograph on the Porifera in Bronn's *Klassen und Ordnungen des Thier-reichs* (p. 221) announced that Desmacella was a synonym of Hamacantha and in this he has been followed by Thiele [1903 B] and Wilson [1904]. This is obviously an erroneous conclusion, for *Hamacantha johnsoni* was not the type of the genus Desmacella and, indeed, was evidently regarded by Schmidt himself as a somewhat aberrant species.

The only question that can arise legitimately is whether or not Desmacella can be

* Compare Ridley and Dendy [1887].

regarded as distinct from Biemna. As a matter of fact Desmacella was allowed for some time to replace Biemna, but Topsent [1890] proposed to revive Biemna (wrongly calling it Biemma) for species with tylostyles and sigmata only, or with tylostyles, sigmata and toxa. Subsequently [1892 c] he restricted it to forms with the structure of Halichondria and tylostyles and sigmata only, while accepting Desmacella for species with a fibrous structure and with a spiculation composed of tylostyles or styles, with sigmata or toxa (or both), to which trichodragmata may be added, for microscleres. Reference to the original types of these two genera shows that Topsent has exactly reversed their characters.

To make matters worse Thiele [1903 B] proposed the new genus Tylodesma for Biemna in Topsent's sense, and this has been accepted by Wilson [1904]. If there is one thing clear in the whole muddle it surely is that Tylodesma is a pure synonym of Desmacella!

If we are to regard Desmacella as a separate genus it can only be on the ground that it lacks the trichodragmata (or raphides) found in Biemna. For the present it appears to me advisable to recognize this distinction, especially as a precisely similar distinction may be used to separate Esperella from Mycale. In fact we may look upon Biemna as a lipochelous genus derived from Mycale and Desmacella as a lipochelous genus derived from Esperella. The presence or absence of toxa is another factor that will have to be taken into account in finally determining the relationships of these genera, but that is a question into which it is not necessary to enter now. [In revising this Report for press I find that Hallmann [1917 A] has proposed the new genus Toxemna for species with toxa, making *Biemna* (*Desmacella*) *tubulata* the type species. I reserve my opinion as to the desirability or otherwise of this proceeding.]

45. *Biemna tubulata* (Dendy).

Desmacella tubulata Dendy [1905, 1916 A]. *Toxemna tubulata* Hallmann [1917 A].

There is one fragmentary specimen of this well-characterized species in the collection, agreeing closely with the Ceylon type both in external form and spiculation. It consists of a number of thin-walled tubes, running parallel with one another, branching and fusing with one another laterally. There is no evidence of the existence of any basal mass to which the tubes might have been attached. This is the third time I have received this sponge from the Indian Ocean, but, owing to its extremely fragile character, I have never yet seen a specimen sufficiently well preserved to be worth figuring for the external form.

Previously known Distribution. Gulf of Manaar, Okhamandal (Dendy).

Register Number, Locality, &c. XXI. 8, Providence, 3.10.05, D. 1, 39 fathoms.

Genus Paresperella Dendy [1905].

Esperellinæ with megascleres in the form of styli or tylostyli, and with microscleres in the form of palmate anisochelæ and serrated sigmata, to which others may be added.

Recent writers have shown but little inclination to accept the genus Paresperella, but in view of the number of species now known and the very well-defined peculiarity of the serrated sigmata I think it very desirable to maintain it. I am not aware that similar sigmata have ever been met with outside the genus.

46. *Paresperella* sp.

The genus is represented in the collection by a number of large, serrated, C-shaped sigmata, measuring about 0·12 mm. in a straight line from bend to bend. These spicules resemble the corresponding spicules of the Ceylon species, *P. serratohamata*, but seem to be less strongly serrated. It is quite possible, however, that they belong to that species. They occur in a preparation of *Rhabderemia pusilla* (R.N. CXVI. A) from Salomon.

Section CLADORHIZEÆ.

Megascleres typically stylote or tylostylote. Chelæ provided with a varying number of teeth, not distinctly palmate.

Genus AMPHILECTUS Vosmaer [1880].

Megascleres smooth styli or tylostyli. Microscleres isochelæ with three or more teeth at each end. External form without definite symmetry.

This genus, as originally proposed by Vosmaer, was a sort of zoological waste-paper basket, and was made to include a great variety of species. The type species, Bowerbank's *Isodictya gracilis* [1866, 1874], is very imperfectly known but I have endeavoured to frame a generic diagnosis in conformity with its characters. Nevertheless I am doubtful whether the species about to be described ought to be regarded as congeneric with *Amphilectus gracilis*. Its isochelæ are very peculiar and it may very likely become necessary in the future to propose a new genus for this and kindred forms, such as Kieschnick's [1900] *Esperiopsis viridis*.

47. *Amphilectus* (?) *unguiculatus* n. sp.

(Plate **12**, fig. 17 *a*—*b*.)

Sponge very thinly encrusting; the single specimen covering the broken-off branch of a coral (?). Surface smooth and subglabrous. Vents and pores not seen. Colour in spirit pale brown (buff). Texture soft, with a thin, translucent, readily separable dermal membrane.

The skeleton consists of loose wisps of slender tylostyles, ascending from the substratum and branching out into subdermal brushes. There is no special dermal skeleton.

Megascleres. Slender tylostyles (Plate **12**, fig. 17 *a*); straight, with fairly well developed, usually oval heads; usually tapering gradually to sharply pointed apices which, however, are sometimes mucronate or blunted; size about 0·32 by 0·0055 mm.

Microscleres. Isochelæ (fig. 17 *b*) of peculiar and variable form. Shaft usually strongly curved, not alate, with a variable number (up to at least six) of claw-like teeth at each end. Sometimes there are only three teeth, and these may be reduced to slight, blunt protuberances; or the whole spicule may be reduced to a curved shaft with slightly thickened ends. Well developed specimens have a length of about 0·03 mm. with a shaft about 0·004 mm. thick.

The nearest approach to this curious species that I have been able to find in the literature is Kieschnick's [1900] *Esperiopsis viridis* (from Amboina or Torres Straits ?) which agrees closely in spiculation but differs much in external form.

Register Number, Locality. CXIII. 10, Egmont Reef.

Sub-family **Ectyoninæ**.

Desmacidonidæ in which the main skeleton is typically echinated by acanthostyles or some form of megasclere derived therefrom. Frequently with specially differentiated, symmetrical or subsymmetrical dermal spicules.

The origin of the spiny echinating spicules which form such a characteristic feature of this sub-family is somewhat difficult to trace. I am inclined to think, however, that they originated in thin encrusting sponges such as Hymeraphia and Microciona and at first echinated the substratum (as they still do in some species) as a protection against animals which feed upon such crusts. In Microciona there is a strong tendency for the megascleres, both smooth and spined styli or tylostyli, to collect together in plumose columns which grow out at right angles to the substratum as the sponge crust thickens. In these columns the bases of the spicules become connected together by spongin. In either case the differentiation of the two ends of the spicule is apparently correlated with the different conditions to which they are exposed. From this starting point it is very easy to derive such genera as Clathria and Plumohalichondria. In Clathria the smooth and spined styli tend to segregate in two groups, the former more or less completely embedded in the strongly developed horny fibre, which now forms a reticulation, and the latter echinating the fibre at various angles.

The chelæ of Microciona and Clathria are minute palmate isochelæ, and toxa are also very frequently present. Amongst the Esperellinæ we find this combination of microscleres in *Artemisina suberitoides* Vosmaer [1885] in which the isochelæ are extraordinarily like those of Microciona and Clathria. This suggests a possible line of derivation of the Ectyoninæ from the Esperellinæ.

From Microciona, or some closely related form, two or three main lines of evolution seem to have branched out. One of these, initiated by the genus Clathria, seems to have retained the small palmate type of isochela and not to have developed any symmetrical dermal megascleres; while in the other, initiated by the genus Plumohalichondria, the isochela assumes the tridentate character and there is a very strong tendency to produce special symmetrical dermal megascleres, which attain their maximum of development in the Cœlosphæreæ.

As in the case of other spicule categories the echinating acanthostyles appear to have dropped out from the spiculation in certain cases, thus giving rise to forms which appear to be Esperelline rather than Ectyonine. This is probably the explanation of the fact that so many of the Myxilleæ lack special echinating spicules, a fact which formerly induced me to regard them as intermediate between the two sub-families*.

Section Clathrieæ.

Ectyoninæ of ordinary form and spiculation; without special symmetrical or subsymmetrical megascleres. Characteristic microscleres, small palmate isochelæ and (frequently) toxa.

* *Vide* "Challenger" Report on the Monaxonida, p. 129.

Genus Microciona Bowerbank [1864].

Sponge thinly encrusting. Main skeleton composed of plumose columns of spicules with their bases imbedded in spongin. Columns not united to form a reticulation. Megascleres styli (and modifications thereof) and acanthostyli (and modifications thereof). Microscleres palmate isochelæ and toxa.

48. *Microciona atrasanguinea* Bowerbank.

(Plate **13**, fig. 1 *a—e.*)

Microciona atrasanguinea Bowerbank [1864, 1866, 1874].
Microciona atrosanguinea Carter [1875, 1880 B].

This common British species has already been recorded by Carter [1880 B] from the Indian Ocean. The "Sealark" material consists of a thin crust (now of a yellowish grey colour) extensively spreading over a madreporarian coral. It differs from British specimens which I have examined in the feebler development of the skeleton columns, the relatively fewer large subtylostyles (styli), and the more numerous small spined echinating spicules, and the absence, so far as I have been able to observe, of spination on the bases of all the large styli, which seldom, if ever, have distinct heads. It seems very doubtful whether Bowerbank's *M. armata* [1866, 1874] can be separated from *M. atrasanguinea.*

For purposes of comparison with the British form the spiculation of the "Sealark" specimen is represented in fig. 1 *a—e,* Plate **13**.

Previously known Distribution. British Seas (Bowerbank); Gulf of Manaar (Carter).
Register Number, Locality. CX. 8, Egmont Reef.

49. *Microciona strepsitoxa* Hope var. *robusta* nov.

Microciona strepsitoxa Hope [1889].

This species is represented in the collection by a small fragment which was found attached, perhaps accidentally, to the surface of the type specimen of *Barbozia primitiva* (R.N. LXXII. 1). It is of very irregular shape, consisting of a flattened portion measuring about 10 mm. in length by 5 in breadth and 2 in thickness, from which three short branches are given off, the largest of which is about 7 mm. in length by 1·5 mm. in diameter. It therefore can hardly have been thinly encrusting, like the type of the species. The appearance of sections of the flattened portion, however, suggests strongly the folding of a very thin sponge-lamina upon itself so as to form two free surfaces, with the surfaces which should be attached to the substratum now in close contact with one another in the middle.

The skeleton is rather complex in its arrangement and consists of the following parts: (1) short plumose columns of stout subtylostyles, springing from whatever represents the original substratum of the sponge (foreign bodies, &c.) and running at right angles to the surface; in some places these columns are reduced to two or three or even single spicules; (2) numerous acantho-subtylostyles taking part in the formation of the plumose columns and echinating the substratum between them; (3) numerous very well developed, radiate dermal brushes of slender subtylostyles; (4) wisps of similar but usually longer spicules

in the interior of the sponge; sometimes running longitudinally and sometimes at right angles to the surface, where they terminate in surface brushes, but the latter are not always connected with such wisps.

Megascleres:—(1) Stout subtylostyli of the plumose columns; slightly curved towards the base; tapering very gradually to the sharply pointed apex; very slightly enlarged at the broadly rounded base, which (alone) is covered with small, sharp or blunt spines. Size very variable, especially as regards length; up to about 0·86 by 0·026 mm.

(2) Short, stout acantho-subtylostyles; tapering gradually from the slightly, if at all, enlarged base to the finely pointed apex; covered all over with short spines, which, on the shaft, are sharp and slightly recurved, while on the base they are rather more numerous, often truncated, and tend to curve towards the shaft; size up to about 0·12 by 0·012 mm. exclusive of spines, not very variable.

(3) Long, slender subtylostyli; straight or nearly so; with very slightly developed oval heads which are usually minutely spined; of two principal sizes, but very variable, viz. about 0·16 by 0·004 mm. (characteristic of the dermal brushes) and about 0·5 by 0·008 mm. (characteristic of the wisps in the interior).

Microscleres:—(1) Toxa; identical with those of the type; very long and slender, with a spiral twist of about one turn in the middle; size commonly about 0·37 by 0·0014 mm. I have seen none of the shorter forms with minutely spined tips, described by Hope, but, on the other hand, the toxa in this variety seem to pass into long, slightly bent oxea, a good deal stouter than themselves but still very slender, measuring, say, about 0·8 by 0·002 mm. These modified toxa are not very common.

(2) Slender, palmate isochelæ, about 0·012 mm. long.

I think there can be no doubt that this is merely a robust variety of the British species.

Previously known Distribution of Species. English Channel (Hope).

Register Number, Locality, &c. LXXII. 1 A, Amirante, 11.10.05, E. 10, 22—85 fathoms.

Genus *Aulospongus* Norman [1878].

Skeleton of plumose columns of smooth and spined styli. No microscleres.

The single known species of this genus appears to be a lipochelous Microciona and it is very questionable whether the genus ought to be retained. As we shall see presently there are also lipochelous species of Clathria.

50. *Aulospongus tubulatus* (Bowerbank).

Haliphysema tubulatum Bowerbank [1873 B].
Aulospongus tubulatus Norman [1878].
Axinella tubulata Dendy [1889].
Aulospongus tubulatus Dendy [1905].

This species forms a very characteristic and conspicuous element of the Ceylon sponge fauna and it is extremely interesting to meet with it again so far afield as Amirante. Both as regards external appearance and skeletal characters the two "Sealark" specimens bear a close resemblance to those that I have seen from Ceylon, though the smooth megascleres are more inclined to be swollen at the base. The larger of the two is massive, subspherical, with strongly conulose surface, and measures about 40 mm. in diameter.

Both specimens exhibit a histological peculiarity which occurs also in the Ceylon specimens, though it has not hitherto been mentioned. This is the presence in the mesogloea of immense numbers of small, thin-walled, subspherical vesicles, frequently with more or less crumpled walls, often morula-like in appearance. The vesicle has a yellow colour and may appear either empty or with granular contents. They vary in size, averaging say about 0·02 mm. in diameter. They often appear in clusters, as if multiplying by budding. I do not know what these vesicles may represent, but their constancy suggests that they are a normal constituent of the sponge.

The Ceylon specimens of this sponge are usually, if not always, infested by the tubicolous polychæte worm, *Polydora armata**, the presence of which led Dr Bowerbank to give a curiously erroneous account of the species and to refer it to the genus Haliphysema. I have found no traces of this worm in the "Sealark" specimens.

Previously known Distribution. Ceylon Seas (Bowerbank, Dendy).

Register Numbers, Localities, &c. XCII. 4, CV. 3, Amirante, 9.10.05, E. 2 and E. 6, 29 and 28 fathoms.

Genus Bubaris Gray [1867 F.]

Lipochelous Clathrieæ of usually encrusting habit. Skeleton consisting chiefly of large styli or tylostyli, projecting outwards either singly or in plumose columns, and with their bases implanted in a mass of usually crooked, symmetrically or subsymmetrically ended megascleres.

There are two very interesting species of this genus in the collection, both characterized by the possession of microscleres in the form of trichites or trichodragmata. In this respect they resemble certain species of Sigmaxinella, while differing in the possession of the basal or axial feltwork of crooked strongyla.

The subsymmetrical megascleres found in the interior of the sponge must be regarded as derived from the normal styli and the genus seems to be a derivative of Microciona or Aulospongus.

51. *Bubaris conulifera* n. sp.

(Plate **7**, fig. 3; Plate **13**, fig. 2 *a—f*.)

The single specimen (Plate **7**, fig. 3) forms a thin crust spreading over a mass of nullipore. From the older and more central portion of the crust a large number of independent but close-set conuli rise vertically upwards. All stages in the development of these conuli are to be observed, from minute papillæ to conical processes 4 mm. in height and rather more than 1 mm. in diameter at the base. The fully developed conuli taper gradually to sharply pointed apices. The entire surface of the sponge, including the conuli, is more or less strongly hispid with projecting spicules. There are no recognizable vents. The colour in spirit is light, dull orange.

The skeleton arrangement is that of a typical Bubaris. There is a dense basal mass of interlacing strongyla, continued up the conuli as a very stout axial skeleton. The basal feltwork and the axial columns alike are abundantly echinated by projecting styli of varying length, which in the conuli project outwards and upwards.

* *Vide* Watson [1905].

Megascleres:—(1) Strongyla of the basal feltwork and axial columns (Plate **13**, fig. 2 *a*). Usually rather stout, boomerang-shaped, rather sharply bent at or near the middle, evenly rounded off at both ends; sometimes more irregularly bent. Size variable, up to about 0·43 by 0·017 mm.

(2) Slender oxea (2 *b*), sharply bent in the middle and gradually and finely pointed at each end, measuring up to about 0·43 by 0·008 mm.; connected with the strongyla by intermediate forms (2 *b'*). A very few much larger oxea occur (2 *c*), up to 1·0 by 0·0227 mm.

(3) Comparatively short, stout styli (2 *d*); broadly rounded at the base, gradually and sharply pointed at the apex; more or less sharply bent near the base; size very variable, say about 0·6 by 0·023 mm. in a typical example.

(4) Very long, slender, almost straight styli (2 *e*); broadly rounded at the base, gradually and sharply pointed at the apex; measuring up to about 1·8 by 0·017 mm. Numerous intermediate forms between these and (3) occur.

Microscleres:—Trichodragmata (2 *f*). Short, compact, slightly curved, measuring about 0·026 by 0·004 mm. Very numerous, sometimes found breaking up into hair-like trichites.

Register Number, Locality, &c. XXI. 11, Providence, 3.10.05, D. 1, 39 fathoms.

52. *Bubaris salomonensis* n. sp.

(Plate **13**, fig. 3 *a*—*b*.)

There are several pieces of this sponge in the collection, all from the same locality and perhaps parts of one and the same specimen. The sponge forms a thin crust, of fairly uniform thickness, spreading over a mass of calcareous débris. The surface is almost even and more or less strongly hispid; without projecting conuli, and, in places at any rate, covered over by a thin dermal membrane. Vents and pores are not recognizable. The largest piece measures about 30 by 20 mm., with a thickness of about 2 mm. The colour in spirit is dull yellowish grey.

The skeleton consists of dense radial columns, so closely set as to be practically continuous. Each column consists of a stout axis of densely packed strongyla, from which stout styli of various dimensions project outwards almost at right angles to the general surface, which is rendered hispid by their apices. The skeleton columns are hardly distinguishable in places, so that the skeleton seems to consist of a basal mass of interlacing strongyla, from which a forest of styli project vertically, the bases of the styli being usually more or less deeply imbedded in the basal mass. There is no special dermal skeleton.

Megascleres:—(1) Strongyla of the basal feltwork and axial columns (Plate **13**, fig. 3 *a*). Usually rather stout and irregularly bent, so as to be more or less crooked; evenly rounded off at both ends, but commonly with one end narrower than the other. Size very variable, especially as regards thickness; up to about 0·3 by 0·026 mm.

(2) Stout styli (fig. 3 *b*); frequently bent near the base, usually sharply pointed and tapering gradually from base to apex; varying greatly in size, especially as regards length, up to about 1·6 by 0·038 mm.; sometimes a little stouter but shorter; often only about as long as the strongyla, with which they are connected by intermediate forms.

Microscleres:—Trichites; slightly curved, about 0·06 mm. long; thickly scattered through the mesoglœa; occasionally in very loose bundles.

This species is readily distinguished from *Bubaris conulifera*, the only other species known to me which contains trichites, by several characters, viz. the absence of the conuli on the surface, due to the more compact arrangement of the skeleton; the absence of the oxea: the less pronounced differentiation of the long, almost straight styli, and the absence of the compact trichodragmata.

A remarkable feature of the "Sealark" specimens is the extraordinary amount of erosion which many of the spicules have undergone while still *in situ* in the sponge, as seen in ordinary hand-sections mounted in Canada balsam (unstained). This erosion amounts in places to complete resorption of the silica, leaving the spicule-sheaths empty but still retaining the form of the spicules. It is evident that the erosion takes place both from the outer surface inwards and from the axial canal outwards. It is best seen in R.N. CXXIV. 1.

Register Numbers, Locality, &c. CXXII. 5, 6, 8, CXXIV. 1, Salomon, 3.7.05, 75 fathoms.

Genus CLATHRIA Schmidt [1862].

Sponge typically clathrous. Main skeleton a reticulation of spiculo-fibre with much spongin. Usually with dermal brushes of slender megascleres. Typical megascleres stout and slender styli (subtylostyli or tylostyli) and spined echinating styli. Microscleres minute palmate isochelæ and sometimes toxa or sigmata.

This genus is evidently very closely related to Microciona, differing chiefly in the more robust growth and the branching and anastomosing of the skeletal columns to form a reticulate skeleton. The plumose arrangement of the spicules characteristic of Microciona is also lost in most species, but not in all. The spiculation is practically identical.

53. *Clathria procera* (Ridley).

(Plate 2, figs. 6, 7.)

Rhaphidophlus procerus Ridley [1884 c].
Echinonema gracilis Ridley [1884 c].
Rhaphidophlus spiculosus Dendy [1889].
Clathria spiculosa Dendy [1905, 1916 A].
Clathria spiculosa var. *ramosa* Dendy [1905].
Clathria spiculosa vars. *ramosa* and *macilenta* [Hentschel 1912].

This species, so variable in external form but apparently very constant in spiculation, is well represented in the collection. Two very distinct forms are present; viz. the long, slender, sparingly branched form, of which R.N. LXXXIV. (Plate 2, fig. 7) is a very good specimen, and the clathrous form, of which R.N. LI. 1 (Plate 2, fig. 6) is a fine example.

Ridley's types of *Rhaphidophlus procerus* and *Echinonema gracilis* and my *Clathria spiculosa* var. *ramosa* are characterized by the former and my typical *Clathria spiculosa* by the latter habit. It was possibly the difference in external form which prevented me from identifying the latter with Ridley's species in the first instance, but, as I have already pointed out [1916 A], the two types of external form cannot be at all sharply distinguished, and there are two very irregular specimens in the present collection. In describing my var. *ramosa*, however [1905], I pointed out the resemblance which it bears to Ridley's *Echinonema gracilis*, but I failed to notice that that species is obviously identical with the same author's *Rhaphidophlus procerus*. In the description of the latter

the account of the spiculation is defective and does not agree with the figures. If allowance is made for this fact it is not difficult to understand why Ridley separated the two specimens not only specifically but even generically.

The characteristic features of the spiculation in this species appear to be the tylote bases of the smooth slender megascleres and the short, stout, imperfectly spined condition of the echinating spicule, but the latter closely resembles the corresponding spicule in *C. corallitincta*.

Previously known Distribution. Port Darwin, Providence Reef (Mascarene Islands) (Ridley); Gulf of Manaar, Ceylon Seas, Okhamandal (Dendy); Aru Islands, Arafura Sea (Hentschel).

Register Numbers, Localities, &c. Long, slender-branched form; XXVIII., Cargados Carajos, 31.8.05, B. 25, 32 fathoms; LXXXIV., Seychelles, 20.10.05, F. 4, 39 fathoms; CVIII. 2, Amirante, 9.10.05, E. 9, 34 fathoms; CXXIX. 4, Seychelles, 20.10.05, F. 2, 31 fathoms; CXXXIII. 5, CXXXIV. 2, Seychelles, F. 9, 37 fathoms; CXXXVIII. 2, Seychelles, 20.10.05, F. 3, 39 fathoms. Clathrous Form; LI. 1, Praslin Reef. Irregular Forms; LXXIII. 2, Amirante, 11.10.05, E. 14, 36 fathoms; XCVIII. 2, Amirante, 9.10.05, E. 3, 25 fathoms.

54. *Clathria corallitincta* Dendy.

? Halichondria frondifera Bowerbank [1875].
? Clathria frondifera Ridley [1884 c].
Clathria corallitincta Dendy [1889, 1916 A].
Clathria frondifera Dendy [1905].

This species is represented in the collection by a number of typical, clathrous specimens. As in the Ceylon specimens the bases of the slender styli are sometimes minutely spined. These spicules vary very much in length. They seem to be characteristically devoid of tylote bases. I am not at all sure that the distinction between this species and *Clathria procera* can be maintained, and both may be merely varieties of *C. frondifera*.

Previously known Distribution. Gulf of Manaar, Ceylon, Okhamandal (Dendy).

Register Numbers, Localities, &c. VII. 1, S. de Malha, 6.9.05, C. 15, 55 fathoms; XI. 5, S. de Malha, 7.9.05, C. 19, 29 fathoms; XXI. 9, 12, Providence, 3.10.05, D. 1, 39 fathoms; CIV., Amirante, 13.10.05, E. 15, 35 fathoms.

55. *Clathria spicata* (Hallmann).

(Plate **5**, fig. 2; Plate **13**, fig. 4 *a—f.*)

Echinonema anchoratum var. *lamellosa* Whitelegge [1901 A], *not* Lendenfeld [1888].
Clathria spicata Hallmann [1912].

There are in the collection three specimens from Cargados Carajos which agree well with the West Australian type of this species as described by Whitelegge and Hallmann. The largest and most perfect specimen (Plate **5**, fig. 2) has been dried. It is erect, stipitate and flabellate. The stalk, about 9 mm. in diameter and 40 mm. in height, terminates below in an expanded base, and passes gradually above into the broad lamina. The latter soon subdivides irregularly into long, digitiform, more or less flattened branches, all lying in approximately the same plane. The surface of the sponge on both sides is rough and rugose, the larger ridges running longitudinally. In the dry specimen especially it has a coarsely porous appearance, perhaps due in part to inhalant canals and in part to

small, scattered vents, for no other vents can be seen. The total height of the dry specimen is about 300 mm. and the greatest breadth about 160 mm. The breadth of the separate branches varies much, averaging perhaps about 12 mm. The thickness of the lamina is about 6 mm. The colour, both dry and in spirit, is light brown, sometimes with a greyish appearance on the surface. The texture, both dry and in spirit, is compressible, resilient and tough.

The two spirit specimens are much smaller but essentially similar to the dry specimen in external characters.

The skeleton is of the usual Clathria type, a close, more or less irregular network of stout, brown, horny fibre, abundantly echinated by small acantho-subtylostyles, while the larger tylostyles commonly core and echinate the primary fibres very irregularly. The arrangement of the spicules in connection with the primary fibres is generally more or less plumose.

There is no well-developed dermal skeleton, but the superficial fibres of the main skeleton, both primary and secondary, are echinated by long, stout tylostyles whose apices project beyond the surface. There are also the usual long, straight, slender, dermal tylostyles, scattered tangentially or in tufts over the surface, and scattered to a much less extent in the deeper parts of the sponge, along with other megascleres.

Megascleres:—(1) Large, stout tylostyles (Plate **13**, fig. 4 *a*); more or less curved; usually with well-developed, subglobular heads which are generally more or less roughened or covered with small spines; remainder of spicule usually quite smooth and tapering gradually to a sharp point; size variable, up to about 0·4 by 0·012 mm.

(2) Small acantho-subtylostyles (fig. 4 *b*); often slightly curved; with both base and shaft pretty uniformly covered with small, sharp spines; size about 0·08 by 0·0068 mm. This is the ordinary echinating spicule; it is connected by intermediate forms (fig. 4 *c*) with (1).

(3) Long, straight, slender, smooth tylostyles (fig. 4 *d*); with small, usually oval heads occasionally feebly spined at the base. Size very variable, up to about 0·37 by 0·004 mm.

Microscleres:—(1) Palmate isochelæ (fig. 4 *e*) of the usual Clathria type, about 0·014 mm. long.

(2) Very long, slender toxa (fig. 4 *f*), angulated in the middle but with the two arms extended almost in a straight line; about 0·24 mm. long. Very scarce.

This species is evidently very closely related to *Clathria whiteleggii* n. sp. The spiculation and skeleton arrangement agree very exactly but there is so much difference in external form that it seems desirable to keep them separate, at any rate for the present, and the external form also serves to separate it from *Clathria* (*Microciona*) *clathrata* Whitelegge [1907]. We have here a group of three species which certainly approach very nearly to the genus Microciona, as indicated more particularly by the tendency of the spicules to form plumose columns.

Previously known Distribution. Western Australia (Hallmann).

Register Numbers, Localities, &c. XLII. 4, XLV. 4, CXLIV., Cargados Carajos, 30 fathoms.

56. *Clathria whiteleggii* n. sp.

(Plate **7**, fig. 1; Plate **13**, fig. 5 *a—f*.)

There are several specimens of this species in the collection, all exhibiting a characteristic clathrous form, consisting, when fully developed, of vertically flattened lamellæ anastomosing with one another in an irregular, honeycomb-like fashion (Plate **7**, fig. 1). The lamellæ are only about 2 mm. thick, while the diameter of the "cells" of the honeycomb averages perhaps about 7 mm., but is very variable. All the specimens appear to have been sessile and more extended in the horizontal than in the vertical plane. The largest measures about 108 mm. in maximum breadth by 53 mm. in maximum height. The surface of the lamellæ is slightly rough and hispid. Vents inconspicuous, not observed. Texture (in spirit) compressible, resilient, rather tough; colour light brown.

The main skeleton is an irregular to rectangular, close-meshed network of stout brown horny fibre. The primary lines are cored and echinated, in a somewhat plumose fashion, by the large, basally spined subtylostyli, which also form the surface hispidation. The secondary lines are typically neither cored nor echinated by these spicules, but both primary and secondary fibres are abundantly echinated by the small acantho-subtylostyles. The diameter of the primary fibres, exclusive of the echination, is about 0·6 and of the secondaries about 0·35 mm.

There is no well-defined dermal skeleton, but the hispidation is due to unusually large subtylostyli which seem to echinate the superficial portion of the network of horny fibres pretty indiscriminately. There are also, at any rate in places, numerous dermal and subdermal, long, slender tylostyli, scattered irregularly or in loose tufts.

Megascleres:—(1) Stout, slightly curved subtylostyli (Plate **13**, fig. 5 *a*). The base is usually distinctly enlarged and covered with small spines, but may be smooth. The remainder of the spicule is almost or quite smooth (in the larger individuals) and tapers gradually to the sharply pointed apex, but in smaller individuals it is often very sparsely and minutely spined. These spicules measure up to about 0·46 by 0·02 mm. (near the head), but many smaller ones occur.

(2) Small acantho-subtylostyles (fig. 5 *b*), the ordinary echinating spicules; usually slightly curved; with feebly developed heads and gradually sharp-pointed apices; fairly uniformly and fairly thickly covered with small, sharp spines, which may be recurved on the shaft; size about 0·08 by 0·008 mm. Connected with (1) by intermediate forms (fig. 5 *c*).

(3) Long, straight, slender tylostyles (fig. 5 *d*); with feebly developed heads, often minutely spined at the base, and gradually and sharply pointed apices. Size variable, up to about 0·33 by 0·006 mm. The characteristic dermal spicule.

Microscleres:—(1) Minute, palmate isochelæ (fig. 5 *e*), of the usual Clathria type; about 0·012 mm. long.

(2) Very long and very slender toxa (fig. 5 *f*), angulated in the middle but with the two arms extended almost in a straight line; about 0·2 mm. long, sometimes in bundles.

This species is evidently very closely related to Whitelegge's *Microciona clathrata* [1907], differing in its non-stipitate, low-growing habit and in the measurement of certain

of the spicules. Hallmann [1912] has re-examined Whitelegge's species and shown that it is really a Clathria.

Clathria whiteleggii differs from the common Indian Ocean species, *C. procera* and *C. corallitincta*, in the usually well-developed and spiny heads of the stout megascleres and in the more uniform spination and slightly curved form of the small echinating spicules.

Register Numbers, Locality, &c. VIII. 1, XV., XCI., Saya de Malha, 6.9.05, C. 15, 55 fathoms.

57. *Clathria madrepora* n. sp.

(Plate **5**, fig. 3; Plate **14**, fig. 1 *a—d.*)

Sponge (Plate **5**, fig. 3) much ramified, Madrepora-like; presumably attached by a very narrow base; branches long, averaging about 8 mm. in diameter, diverging upwards at acute angles, with a tendency to lie in one plane and sometimes anastomosing with one another; with much corrugated and to some extent aculeated surface. The dermal membrane is fairly distinct and in places contains much sand. Vents not conspicuous. Texture compressible, resilient, fairly tough. Colour in spirit (after formalin) dark grey-brown. The largest piece measures about 180 mm. in total height and is made up of a large number of branches of very various lengths; a smaller piece in the same jar is probably part of the same specimen.

The main skeleton is a fairly close but very irregular network of dark brown horny fibre, very irregularly cored and echinated, in a more or less plumose fashion, by large, stout tylostyles, and with only a very few small acantho-subtylostyles.

The dermal skeleton consists of numerous slender tylostyles scattered in the dermal membrane. Both stout and slender tylostyles also occur abundantly scattered in the mesoglœa in the interior of the sponge.

Megascleres:—(1) Large, stout tylostyles (Plate **14**, fig. 1 *a*), with subglobular heads which are usually roughened or minutely spined. The remainder of the spicule is perfectly smooth, slightly curved, and tapers gradually from its junction with the head to the sharply pointed apex. These spicules ordinarily measure up to about 0·24 by 0·024 mm.; larger forms being met with only exceptionally. More slender forms of about the same length are possibly young (fig. 1 *a'*).

(2) Acantho-subtylostyles (fig. 1 *b*); short, straight, gradually and sharply pointed at the apex; with numerous small spines on the slightly enlarged head, more sparsely spined elsewhere; spination altogether feeble. Size about 0·1 by 0·0068 mm. Very scarce.

(3) Straight, slender tylostyles (fig. 1 *c*) with small oval heads often minutely spined at the base; tapering very gradually to an often abruptly pointed apex. Size about 0·2 by 0·004 mm. The characteristic dermal spicule.

Microscleres:—Small, slender isochelæ (fig. 1 *d*), sometimes slightly contort, with palms and fimbriæ almost completely suppressed, so that they closely resemble sigmata. Measuring about 0·014 mm. from bend to bend. Abundant, both in the dermal membrane and in the interior of the sponge. I at first mistook these spicules for true sigmata, but the characteristic sharp angulation at the bends and the faint traces of palms and fimbriæ, reveal their true nature.

Very few species of Clathria are known to contain sigmata. In *C. spongodes*, however, they appear to be the only microscleres. The latter species is evidently very closely related to *C. madrepora*, but the sigmata are well rounded at the bends and readily distinguishable from the ordinary Clathria isochelæ, even in side view. Such facts as these suggest very forcibly that the chela is merely a modified sigma, a view which is supported by the occasional occurrence of contortion, like that of a contort sigma. This is well seen in the isochelæ of *Microciona acerato-obtusa*, as figured by Hentschel [1911 A]. The latter species also closely resembles *Clathria madrepora* in certain features of its spiculation, especially in the stout, basally spined tylostyles, and it is very difficult to see where the boundary line between Clathria and Microciona should be drawn.

Register Number, Locality, &c. CXXX., Seychelles, F. 9, 37 fathoms.

58. *Clathria spongodes* n. sp.

(Plate **6**, fig. 1; Plate **14**, fig. 2 *a*—*d*.)

Sponge (Plate **6**, fig. 1), massive, lobose, irregular, sessile. Surface cauliflower-like, thickly covered with small, rough conuli, each about 2 mm. in height and 1 mm. in diameter, commonly grouped in bunches. Dermal membrane conspicuous only in places. Vents of moderate size, inconspicuous, scattered in the depressions between the bunches of conuli. The largest piece measures about 55 by 38 by 28 mm. A smaller piece has probably been detached from it. Texture firm, fairly rough, resilient; very sandy. Colour in spirit (after formalin) dark brown.

The skeleton is an irregular reticulation of stout, dark brown, horny fibre, abundantly echinated, in a more or less plumose fashion, by large, basally spined tylostyles and small acantho-subtylostyles. There is no special axial core of spicules and the fibres themselves appear to be pretty free from foreign matter, though there is a great deal of sand scattered in the mesoglœa between them.

The dermal skeleton is not very well developed, but a large number of smooth, slender tylostyles occur scattered irregularly in the dermal membrane.

Megascleres:—(1) Large, stout tylostyli (Plate **14**, fig. 2 *a*), with distinct subglobular heads usually thickly covered with small, sharp spines; the remainder of the spicule is perfectly smooth, usually slightly curved and tapering gradually from its abrupt junction with the head to the finely pointed apex. These spicules vary much in size, measuring up to about 0·47 by 0·02 mm.

(2) Small, straight acantho-subtylostyli (fig. 2 *b*); spined all over except near the apex; size about 0·094 by 0·008 mm.

(3) Straight, smooth, slender tylostyli (fig. 2 *c*), with small oval heads and finely and gradually pointed apices; size about 0·24 by 0·003 mm. The characteristic dermal spicule.

Microscleres:—Very slender sigmata (fig. 2 *d*); well rounded at the bends, may be slightly contort; measuring about 0·014 mm. from bend to bend.

Register Number, Locality, &c. LXXIX. 2, Amirante, 11.10.05, E. 4, 36 fathoms.

59. *Clathria chelifera* (Hentschel).

(Plate **14**, fig. 3 *a*—*e*.)

Spanioplon cheliferum Hentschel [1911 A].

There are two specimens of this curious species in the collection. One of them (R.N. CVI. 6) consists of a massive, cavernous body, growing amongst calcareous débris and extending in the form of two slender, subcylindrical processes, which are enlarged and cavernous at the base. The maximum diameter of the main body is about 18 mm. The longer of the two processes, exclusive of its enlarged base, is about 41 mm. in length by 2 mm. in diameter. It is not tubular, but to some extent cavernous, and hispid on the surface. The enlarged basal portion measures about 14 by 8 mm. The other process has an enlarged basal portion of about the same size, but the slender cylindrical attachment measures only about 5 by 1·5 mm. The texture in spirit is soft, compressible and resilient, the colour pale greyish yellow. A few moderate-sized vents occur in the basal portions of the sponge.

The second specimen (R.N. CVIII. 3) consists of a few irregular, slender branches, occasionally anastomosing with one another and in two places enlarging to form an irregular, nodular mass, one of which has grown over the branches of a Polyzoon and bears two or three small vents.

The main skeleton is a loose, irregular reticulation of spicular fibre, containing a large amount of very pale coloured spongin. In the slender processes the main lines run lengthwise. The fibres are abundantly cored by styli and sparsely echinated by acanthostyles. The dermal skeleton consists of slender strongyla, mostly arranged in loose brushes.

Megascleres:—(1) Styli (Plate **14**, fig. 3 *a*); rather slender, slightly curved, evenly rounded off at the base, rather abruptly pointed at the apex. Sometimes entirely smooth, always smooth for the greater part of the length, but frequently with a few minute spines at the base and sometimes also close to the apex. Size about 0·19 by 0·0068 mm.

(2) Acanthostyles (fig. 3 *b*); usually slightly curved, rather sparingly spined, except at the base. Spines of moderate size, on the shaft recurved, thorn-like. Apex gradually and sharply pointed; size about 0·12 by 0·0082 mm.

(3) Strongyla (fig. 3 *c*); straight or slightly crooked. Ends rather abruptly truncated, not enlarged, with a few small terminal spines. Size about 0·22 by 0·005 mm.

Microscleres:—Palmate isochelæ of two sizes. In the larger ones (fig. 3 *d*) the tips of the palms may be turned slightly outwards and sometimes appear slightly thickened in side view; the shaft is very slender; length about 0·024 mm. The smaller ones (fig. 3 *e*) are typical "naviculiform" Clathria isochelæ, about 0·01 mm. long. Both forms are numerous and intermediate sizes also occur.

The above account of the skeleton arrangement and spiculation is based upon R.N. CVI. 6. The spiculation of R.N. CVIII. 3 differs in no essential respect, but the development of spines on the principal styli and on the strongyla appears to be even less pronounced.

The "Sealark" specimens appear to differ from Hentschel's type in the not infrequent partial spination of the principal styli, and in the fact that the larger isochelæ are sometimes twice as long.

Hentschel, while referring this species doubtfully to the genus Spanioplon, remarks that it may be best regarded as a Clathria in which the dermal spicules have become converted into "amphistrongyla," a view with which I entirely agree. It differs from Spanioplon in the presence of microscleres and probably in other respects, and it seems best to refer it to the genus Clathria for the present, though it may be necessary to propose a new genus for it at some future time.

Clathria australiensis var. *spinulata* Hentschel [1911 A], in which the principal styli are also spined at the base and apex, serves to connect this species with the more typical Clathrias.

Previously known Distribution. West Australia (Hentschel).

Register Numbers, Localities, &c. CVI. 6, Amirante, 13.10.05, E. 16, 39 fathoms; CVIII. 3, Amirante, 9.10.05, E. 9, 34 fathoms.

Genus Echinoclathria Carter [1885—6].

Sponge clathrous, typically a honeycombed mass of flattened, anastomosing trabeculæ. Skeleton reticulate, composed of spongin fibres echinated by smooth styli and usually cored by either styli or strongyla. Palmate isochelæ may occur.

The only species of this genus in the collection is one of those that have been placed in Thiele's genus Echinochalina [1903 B], but I am unable to see any sufficient grounds for separating this supposed genus from Echinoclathria.

60. *Echinoclathria intermedia* Whitelegge.

(Plate **2**, fig. 8.)

Thalassodendron viminalis Whitelegge [1901 A] (*not* Lendenfeld [1888]).
Echinoclathria intermedia Whitelegge [1901 B].
Echinochalina intermedia Hallmann [1912].

I identify with this little known species a single specimen (Plate **2**, fig. 8) which differs from the type in two chief respects. In the first place, to judge from the descriptions given by Whitelegge and Hallmann, the trabeculæ which form the clathrous, massive sponge seem to be less robust, and the entire specimen is more compact, with smaller interspaces, than I should gather is the case with the type. At its upper end the sponge is especially compact and terminates in a number of short, rounded proliferations. In the second place the slender coring and interstitial spicules seem to be all strongyla; I have not been able to find a single one that is not rounded off at both ends, while in the type they are usually hastately pointed at one end and rounded at the other, rarely truly strongylote. These spicules vary so much in other species, however, that I am not disposed to attach much importance to this difference. The smooth, stout, echinating styli are usually slightly narrowed at the base and subtylote, they measure about 0·11 by 0·007 mm. The strongyla measure about 0·2 by 0·003 mm., which also agrees fairly closely with Hallmann's measurements. There is a large amount of spongin in the skeleton fibres, whereas in the type the fibres are said to be comparatively poor in spongin. The specimen measures about 72 mm. in height by 35 mm. in maximum transverse diameter.

Register Number, Locality, &c. XXVII., Cargados Carajos, 30.8.05, B. 17, 20—25 fathoms.

Genus Raspailia (Nardo) Schmidt [1862].

Of elongated, slender, branching habit. Skeleton composed of a dense central axis of spicular fibre containing much spongin, from which bundles or tufts of spicules radiate to the surface. Typical megascleres, smooth styli and acanthostyles (echinating). No microscleres.

61. *Raspailia* sp.

A single very small specimen, which I am unable to identify specifically, represents this genus in the collection. It was found in association with *Plocamia elegans*, to which it was probably attached, and consists of a short, cylindrical stalk dividing into two branches. The whole specimen measures only 15 mm. in height, and the diameter of stem and branches is about 1·5 mm. The colour in spirit is nearly white. The skeleton is arranged in a perfectly typical manner. A reticulation of stout horny fibre, cored chiefly by slender styli in longitudinal tracts, forms a skeletal axis from which short columns of stout styli, held together by spongin, radiate to the surface. Echinating acanthostyles occur in the axial part of the skeleton, but are scarce. The dermal brushes of straight, slender subtylostyles are very well developed.

Megascleres:—(1) Smooth, stout styli, evenly rounded off at the base, gradually sharp-pointed at the apex; size variable, up to about 0·45 by 0·016 mm. (? occasionally oxeote).

(2) Acanthostyles; sharply pointed, fairly strongly spined; measuring about 0·07 by 0·006 mm.

(3) Very long, straight, slender subtylostyli of the interior of the sponge (also sometimes projecting from the surface), measuring about 0·37 by 0·004 mm.

(4) Shorter, slender subtylostyli of the dermal brushes, measuring about 0·17 by 0·002 mm.

This form is evidently nearly related to the European *Raspailia hispida.*

Register Number, Locality, &c. LXXXIX. 3, Cargados Carajos, B. 29, 1.9.05, 45 fathoms.

Genus Ectyon Gray [1867 f].

Clathrieæ in which the skeleton is a network of stout horny fibre, echinated, and sometimes cored, by more or less verticillately spined styli. No other spicules.

It appears to me that Gray's name Ectyon must replace the name Agelas by which this genus is generally known. Duchassaing and Michelotti's genus Agelas [1864] is really quite unrecognizable, while there can hardly be any mistake about Gray's, which was founded upon a very characteristic figure in Bowerbank's *Monograph of British Sponges*, Vol. I. Pl. XVII, fig. 289.

This genus is very interesting on account of the suppression of all the spicules except the acanthostyles, and the very strong development of the horny fibre, indicating a possible origin for some of the pseudoceratose sponges.

62. *Ectyon ceylonica* (Dendy).

(Plate **6**, fig. 2.)

Agelas ceylonica Dendy [1905].

The single specimen in the collection (Plate **6**, fig. 2) consists of about half a dozen short, digitiform branches, rising up vertically side by side from a basal crust and subdividing to a slight extent, the subdivisions being incompletely separated from one another. The branches are subcylindrical and about 5 mm. in diameter. They terminate bluntly and their surfaces are thickly covered with small, sharp and blunt conuli. The total height of the specimen is about 27 mm., the greatest width just about the same. Vents are apparently represented by rounded apertures of varying size in the translucent dermal membrane stretched between the conuli. The colour in spirit is dark brown, but there were many other specimens in the same jar, so that this colour is possibly due to staining; the type specimen from Ceylon, however, was also brown. The texture is compressible and elastic.

The specimen agrees very closely with the type as regards skeleton arrangement and spiculation. I may add, however, that in addition to the characteristic verticillately spined styli there are a few smooth styli, connected with the former by intermediate forms, and the same is true of the type. The size of the spicules is very variable, up to about 0·32 by 0·024 mm. (at the base, inclusive of spines).

Previously known Distribution. Ceylon (Dendy).

Register Number, Locality, &c. LXXVIII. 15, Cargados Carajos, 28.3.05, B. 2, 30 fathoms.

Genus Echinodictyum Ridley [1881].

Skeleton a network of spicular fibre, containing oxea and echinated by acanthostyles. Smooth styli may also occur. No microscleres.

The presence of apparently primitive oxea as the principal megascleres in this genus is somewhat remarkable; long, smooth styli may, however, also occur. One can only observe that oxea and styli appear in many sponges to be almost interchangeable and wait for further light upon its relationships.

63. *Echinodictyum clathratum* Dendy [1905].

There are half a dozen specimens of this sponge in the collection, most of which attain a much larger size than the original Ceylon type, measuring up to about 105 by 50 mm. They agree closely in appearance with Thiele's figure of *E. cavernosum* from Celebes [1899] and Hentschel's figure of *E. fruticosum* from S.W. Australia [1911 A], and I cannot help suspecting that all these forms, and also perhaps *C. asperum* Ridley and Dendy [1887] from Tahiti, may really belong to one and the same species. At present, however, *E. clathratum* may still be distinguished on account of its large styli, which have not yet been found in any of the others. Otherwise the spiculation agrees very closely with the accounts given by Thiele and Hentschel. The oxea range from about 0·2 by 0·008 to 0·8 by 0·012 mm.; more slender forms being probably young. The smooth slender styli usually measure only about 0·4 by 0·004 mm. and sometimes occur in surface brushes. The larger styli, which

occur scattered in the interior of the sponge, may measure as much as 1·7 by 0·012 mm. The acanthostyles are somewhat shorter than those of the type and more distinctly blunted at the apex. They measure about 0·09 by 0·008 mm. The spicular measurements were taken from R.N. XLV. 1.

There appear to be no microscleres in any of the specimens, so that there can be no reasonable doubt that those which I observed in the type were, as suspected at the time, foreign.

The colour of the "Sealark" specimens ranges from light brown to purplish black and is due to the presence of numerous pigment granules.

Previously known Distribution. Ceylon Seas (Dendy).

Register Numbers, Localities, &c. XLII. 2, XLV. 1, Cargados Carajos, 30 fathoms; LXVII. 1, LXVIII. 7, Diego Garcia, 10—12½ fathoms; CXX. 15, Salomon, 10—14 fathoms; CXLIX., Barachois, Diego, 12.7.05.

Section Collosclerophoreæ.

Ectyoninæ which, in addition to spicules of the usual chemical composition, possess colloscleres composed of gelatinous silica. Apparently derivatives of the genus Clathria.

I propose this section for the two genera Collosclerophora Dendy [1916 E] and Colloclathria n. gen. Although agreeing in the possession of the very remarkable colloscleres these two genera differ somewhat widely in other respects. Colloclathria is evidently a direct derivative of Clathria, but Collosclerophora is a sand sponge with greatly reduced spiculation. It is not improbable that the colloscleres may have arisen independently in the two genera by the loss of certain factors whose cooperation is necessary for the development of perfect spicules [cf. Dendy 1917], but it is convenient to keep the two together in one section for the present.

Genus Colloclathria n. gen.

Sponge cylindrical, ramose (? always). Skeleton arrangement and spiculation as in Clathria, with the addition of colloscleres resembling grains of rice.

There can be no doubt about the close relationship of this genus to Clathria, from which it is distinguished only by the presence of the colloscleres. These remarkable gelatinous spicules have hitherto been found only in one other sponge—*Collosclerophora arenacea* [Dendy 1916 E], from Southern Australia, which has perhaps been derived from some such form as *Colloclathria* through the replacement of the greater part of the proper skeleton by sand.

64. *Colloclathria ramosa* n. sp.

(Plate **7**, fig. 2; Plate **14**, fig. 4 *a—h.*)

Sponge (Plate **7**, fig. 2) probably prostrate or semi-prostrate; consisting of long, slender, subcylindrical processes, branching and anastomosing sparingly and in a very irregular fashion. The branches vary from about 2 to 4 mm. in diameter and the longest is about 140 mm. in length. They terminate bluntly and may be somewhat nodose. No main stem can be distinguished. Vents small and scattered, few in number. Surface rather uneven but nearly smooth, though very minutely hispid under a pocket-lens. Colour in spirit light brown. Texture compressible and resilient, tough.

The main skeleton is a rather irregular network of fairly stout horny fibre, cored and echinated by the megascleres in the usual Clathria fashion. The primary fibres are about 0·05 mm. in diameter; they run longitudinally in the interior of the sponge and curve outwards towards the surface, where they terminate in brushes of spicules. They are connected by secondary fibres little, if at all, more slender than themselves. The spicular coring and echination of the fibres is very irregular and numerous megascleres occur scattered in the mesoglœa between.

The dermal skeleton is not strongly developed and consists of rather sparsely scattered brushes of megascleres. Some of these mark the terminations of the primary fibres and these contain stout styli as well as slender forms. Others, more numerous, and more or less independent of the main skeleton fibres, though perhaps really branching off from them, project from the surface between the extensive subdermal cavities; these consist of slender forms only.

Megascleres:—(1) Stout, smooth styli (Plate **14**, fig. 4 *a*); slightly curved, broadly rounded at the base and tapering gradually to a finely pointed apex. Size about 0·3 by 0·019 mm., but variable. These occur chiefly as coring spicules in both primary and secondary fibres.

(2) Acantho-subtylostyles (fig. 4 *b*); very short, stout, straight, with abruptly and sharply pointed apex; abundantly covered with rather small, sharp spines, except at the apex and sometimes for some distance above the slightly enlarged base. Size about 0·07 by 0·008 mm. (exclusive of spines). These are the characteristic echinating spicules, developed chiefly, but not exclusively, on the primary fibres as the latter curve outwards to the surface. There are no forms intermediate between these and the large, stout, smooth styli (1).

(3) Long, straight, slender styli, subtylostyli or tylostyli (fig. 4 *c*); varying greatly in size up to about 0·4 by 0·0082 mm. Often minutely spined at the base. These spicules occur chiefly in the surface tufts (the smaller forms) but are also abundant as coring spicules in the primary fibres, and scattered in the mesoglœa.

Microscleres:—(1) Small, palmate isochelæ (fig. 4 *d*), of the usual Clathria type, up to about 0·016 mm. long; may be abundant.

(2) Excessively minute forms (fig. 4 *g*), only about 0·004 mm. long; probably isochelæ, but only visible as a slender shaft with an enlargement at each end. Also numerous in some specimens.

(3) Slender toxa (fig. 4 *h*), varying greatly in form and size, as shown in the figures. Up to about 0·2 mm. long. Numerous in some specimens.

(4) Colloscleres (fig. 4 *f*) small, sausage- or kidney-shaped bodies, more or less constricted in the middle; of just about the same size and proportions as the palmate isochelæ, usually about 0·012 by 0·004 mm. Enormously abundant, scattered through the sponge like grains of rice. Forms intermediate in appearance between these and the ordinary isochelæ occur (fig. 4 *e*), so that it is difficult to believe that the two are not homologous. Indeed, until I found that the colloscleres swelled up on addition of water I had no doubts on this point and regarded them merely as palmate isochelæ with the space between shaft and palms filled in with silica.

The behaviour of these bodies on addition of water is identical with that observed in the collosclerés of *Collosclerophora arenacea*, except that while the swelling reaction was beautifully manifested on the addition of water to material in 70°/₀ alcohol it could not be observed when water was similarly added to material in absolute alcohol. It would appear, therefore, that in this case complete dehydration destroys the capacity for absorbing water, which is evidently not the case in *Collosclerophora*, in which the swelling took place after dehydration and preservation for more than twenty years in Canada balsam. Owing, doubtless, to their becoming swollen and disorganized, these bodies are entirely missing in spicule preparations boiled out in the usual manner in acid.

The above account of the spiculation is taken from R.N. CXXXVIII. 1, except that the experiments with the collosclerés were made upon R.N. CVIII. 1.

I have also been able to make some observations concerning the canal-system and histology in the case of CVIII. 1, which I have studied by means of paraffin sections and teased preparations stained with paracarmine. The extensive subdermal cavities are covered over by a thin dermal membrane, pierced, no doubt, by the inhalant pores, but these I have been able to detect only occasionally. The canal-system is more or less lacunar throughout. The flagellate chambers, which occur scattered throughout the whole of the mesoglœa beneath the subdermal cavities, are spherical, about 0·02 mm. in diameter, and eurypylous. The collosclerés are most abundant just beneath the subdermal cavities, where they are associated with dense masses of small, granular, spherical cells, about 0·008 mm. in diameter. These cells are probably the scleroblasts (silicoblasts), similar to those described by me in *Collosclerophora*, but much smaller in accordance with the smaller size of the collosclerés. I have not been able to make out the development of the collosclerés, nor have I found them lying in vesicles as in *Collosclerophora*.

Register Numbers, Localities, &c. LII. 4, Coetivy; CVIII. 1, Amirante, 9.10.05, E. 9, 34 fathoms; CXXXVIII. 1, Seychelles, 20.10.05, F. 3, 39 fathoms.

Section PLOCAMIEÆ.

Ectyoninæ in which the main skeleton is a reticulation of dumb-bell or sausage-shaped megascleres, usually more or less spiny.

I propose to group together in this section the genera Plocamia Schmidt [1870], Damiria Keller [1891], Lithoplocamia n. gen. and Plocamiopsis Topsent [1904 A].

Genus PLOCAMIA Schmidt [1870].

The characteristic megascleres are dumb-bell or sausage-shaped, usually more or less spiny (acanthostrongyla), in addition to which styli or tylostili of various forms also occur. Echinating acanthostyles may be present and sometimes slender tylota. Typical microscleres palmate isochelæ and sometimes toxa.

65. *Plocamia coriacea* (Bowerbank).

Isodictya coriacea Bowerbank [1874].
Dirrhopalum coriaceum Ridley [1881].
Plocamia coriacea Hanitsch [1894].
Plocamia ridleyi Hentschel [1912].

This species is represented in the collection by a small, thin crust, attached to a large dry Lithistid (R.N. CXLVII, *Taprobane herdmani*).

I have had the advantage of comparing the spiculation of an Irish specimen from the Dublin museum and have no doubt of the identification, though the megascleres in the "Sealark" specimen attain a considerably larger size. The spiculation is as follows :—

Megascleres:—(1) Large subtylostyli; curved; measuring up to 0·66 by 0·0164 mm.

(2) Slender tylostyli; with oval heads; measuring up to 0·43 by 0·0027 mm.

(3) Acanthostyli; up to 0·23 by 0·01 mm.

(4) Acanthostrongyla; about 0·12 by 0·012 mm., most richly spined at the extremities.

Microscleres:—(1) Palmate isochelæ; about 0·016 mm. long.

(2) Toxa; large and small, the large ones measuring up to 0·2 by 0·0027 mm. and spined at the extremities.

Ridley, in his account of the spiculation, does not mention the slender tylostyles, nor are they figured by Bowerbank, but they occur in the Dublin specimen and I have no doubt are characteristic of the species. Hentschel's *Plocamia ridleyi* is obviously a synonym of this species, which he seems to have overlooked.

Previously known Distribution. British Seas (Bowerbank); Aru Islands, Arafura Sea (Hentschel).

Register Number, Locality, &c. CXLVII. (4), Amirante, 11.10.05.

66. *Plocamia elegans* (Ridley and Dendy).

Plocamia coriacea var. *elegans* Ridley and Dendy [1887].
Plocamia coriacea var. *elegans* Topsent [1892 C, 1904 A].

This pretty little sponge is represented in the collection by a large number of fragments. It must have resembled very closely the specimen of *Plocamia coriacea* var. *elegans* figured in the "Challenger" Report, but on a smaller scale, consisting of very slender and rather short, cylindrical branches, ramifying irregularly and occasionally anastomosing with one another. The diameter of the branches does not exceed 1·5 mm. It is curious how completely the specimen has been broken up in the dredge, for although there is a good deal of it altogether the largest fragment is only about 16 mm. in length. It is evidently very fragile. The surface is minutely hispid; the colour in spirit pale yellow.

The main skeleton is a close, sub-isodictyal reticulation of acanthostrongyla and acanthostyli, occupying about five-sixths of the total diameter of the sponge and surrounded by a comparatively thin zone penetrated by radially arranged spicules, which form the outer part of the skeleton and give rise to the hispidity of the surface. The radiating spicules comprise long, stout styli, arranged singly; very slender subtylostyli, which tend to arrange themselves in loose brushes which are frequently more or less flattened down against the surface, and acanthostyli, which may be said to echinate the outer surface of the main skeleton taken as a whole. In the main skeleton occasional longitudinal bands of spicular fibre occur, in which all the megascleres may figure. There is very little spongin.

Megascleres:—(1) Acanthostrongyla; moderately stout, slightly curved, abundantly covered all over with small, sharp spines; size about 0·07 by 0·005 mm., exclusive of spines.

(2) Acanthostyli; more or less curved, tapering gradually to a long, fine point; abundantly covered with small, sharp spines towards the base, but the spination becoming

more or less obsolete on the distal portion, until the apex is quite smooth. Size about 0·147 by 0·005 mm., but rather variable and perhaps usually a little less.

(3) Long, stout styli or subtylostyli; slightly curved towards the base, gradually and finely pointed at the apex; base often very minutely spined, otherwise quite smooth. Size about 0·45 by 0·0082 mm.

(4) Very slender subtylostyli; straight or nearly so, with feebly developed oval heads and very fine points. Size about 0·3 by 0·002 mm. Intermediate forms between 3 and 4 occur.

Microscleres:—(1) Slender, palmate isochelæ; Clathria-like; about 0·014 mm. long.

(2) Short, slender, strongly curved toxa; about 0·044 mm. long. Very scarce.

In spite of its fragmentary condition the material is well preserved, so that it is possible to make out a good deal as to the canal-system. There are extensive, shallow subdermal cavities and the canal-system as a whole is lacunar. Flagellate chambers occur throughout the entire thickness of the sponge beneath the subdermal cavities. They are spherical, eurypylous and about 0·028 mm. in diameter.

This specimen differs from the "Challenger" specimen chiefly in the extreme rarity of the toxa, which I could not for some time find at all. In view of its characteristic external form and wide distribution it seems desirable to raise the variety *elegans* to specific rank, especially as the typical *P. coriacea* seems to enjoy an equally wide distribution.

Previously known Distribution. Azores (Ridley and Dendy, Topsent).

Register Number, Locality, &c. LXXXIX. 2, Cargados Carajos, B. 29, 1.9.05, 45 fathoms.

67. *Plocamia massalis* n. sp.

(Plate **14**, Fig. 5 *a*—*c*.)

The single specimen is a compact, massive sponge, with convex upper surface. The lower portion of the sponge has apparently been torn off from a broad attachment. The vents are rather numerous and irregularly scattered on the somewhat uneven upper surface. They measure up to about 3 mm. in diameter and sometimes have strongly projecting margins in the form of short cylindrical tubes; cylindrical exhalant canals, of the same diameter as the vents, penetrate far into the interior of the sponge. The texture of the sponge is firm, dense and incompressible; rather friable. It contains a good deal of sand, especially in the deeper portions. The colour in spirit is dark chocolate brown throughout*, apparently due to the presence of an immense number of brown pigment granules, especially conspicuous in the dermal membrane, where they are grouped in rounded masses about 0·016 mm. in diameter. The specimen measures about 65 mm. in maximum breadth by 35 mm. in maximum thickness.

The main skeleton is a very dense, sub-isodictyal but irregular reticulation of more or less curved acanthostrongyla, occasionally with ill-defined spicular fibres composed largely of the characteristically dermal tylota.

The dermal skeleton consists of long and rather slender tylota, scattered tangentially in the dermal membrane.

* All the other sponges in the same jar, and the label, were stained brown, but this specimen appears to have been the source of the pigment.

Megascleres:—(1) Acanthostrongyla (Plate **14**, fig. 5 *a*); more or less curved; with the spines most abundantly developed towards the two ends and sometimes showing a tendency to be arranged in whorls; spines small and sharp, numerous. Very frequently one end shows a central point, which seems to represent the apex of the spicule rather than a mere spine and probably indicates that the spicule is really a modified acanthostyle. Size about 0·185 by 0·0082 mm., but rather variable.

(2) Tylota (fig. 5 *b*); with long, smooth, slightly curved shaft and small, subspherical or oval heads, usually minutely spined all over. Size about 0·37 by 0·008 mm.

Microscleres:—Palmate isochelæ (fig. 5 *c*); Clathria-like; with very slender, rather strongly curved shaft; length about 0·0164 mm. Very scarce but no doubt proper to the sponge.

This is not a very typical *Plocamia*. The usual echinating acanthostyles are not recognizable, unless they are represented by the unsymmetrically ended acanthostrongyla described above. Also, there are no dermal tylostyles or subtylostyles, such as often occur in the genus; though here I was at first misled by the presence of a thinly encrusting suberitid sponge, with tylostyles, which covers a large part of the surface.

Register Number, Locality, &c. CXXV. 2, Mauritius, 23.8.05, > 100 fathoms.

Genus Lithoplocamia n. gen.

The main skeleton is a dense, sub-isodictyal reticulation of acanthostrongyla, with which are associated smooth diactinal and monactinal spicules. There are no echinating spicules and no microscleres.

This genus is perhaps to be regarded as derived from *Plocamia* by loss of microscleres. The general arrangement of the skeleton resembles closely that of *Plocamia massalis*, in which also the echinating spicules have disappeared. It is also probably related to the genus Damiria of Keller [1891], in which the spicules are all tylota (or strongyla) with the ends alone spined.

68. *Lithoplocamia lithistoides* n. sp.

(Plate **14**, fig. 6.)

Sponge massive, encrusting; with uneven, more or less nodular surface, minutely rough and sometimes sparingly and very minutely hispid. Vents minute, inconspicuous.

Texture very hard, compact and incompressible. Colour in spirit pale greyish yellow*.

The specimen which I regard as the type of the species (R.N. CXXXVII. 2) is hemispherical (or shortly columnar), with a broad, flat, slightly expanded base of attachment. The surface is broken up into small, irregular areas by a network of grooves, probably all covered over in life by a thin, transparent dermal membrane, portions of which remain. The height of the specimen is 16 mm., the maximum diameter of the base 20 mm. The second specimen (R.N. CXXVII. 2) is a good deal larger and has the form of a nodulated crust, on which the surface grooves are scarcely at all developed. It measures about 35 mm. in maximum breadth and 10 mm. in average thickness.

* R.N. CXXVII. 2 has a purplish tint, but this is probably due to staining by another sponge in the same jar.

The main skeleton is a very dense, sub-isodictyal reticulation of acanthostrongyla.

These spicules make up very nearly the entire skeleton, but here and there ill-defined bands of smooth styli can be seen running towards the surface.

In R.N. CXXXVII. 2 I have been able to find no dermal skeleton, the dermal membrane, where still preserved, being practically without spicules. In R.N. CXXVII. 2, however, the dermal membrane, which is more extensively present, contains numerous very slender, long, curved, smooth oxea, scattered or in very loose, radiate tufts, which sometimes seem to be associated with the ends of the bands of smooth styli. Similar slender oxea occur scattered in the deeper parts of the sponge.

Spicules:—(1) Acanthostrongyla (Plate **14**, fig. 6); stout, short, slightly curved, with strong, sharp spines pretty evenly distributed all over. Size usually about 0·17 by 0·02 mm. (exclusive of spines).

(2) Stout, smooth styli or subtylostyli; slightly curved, sharply and fairly gradually pointed; size variable, commonly about 0·35 by 0·018 mm.

A few much longer, smooth spicules, especially styli, also occur, and in R.N. CXXVII. 2, as already observed, slender oxea are abundant in the dermal membrane, where they measure about 0·4 by 0·004 mm. In R.N. CXXXVII. 2 oxea, at any rate of this type, are extremely rare, if present at all.

In R.N. CXXXVII. 2, however, a few extraordinarily elongated sigmata occur, of a type which I have never seen before, resembling long slender oxea with recurved ends. At present I regard these as foreign.

The two specimens described above ought, perhaps, to be regarded as at any rate varietally distinct. In addition to the differences already mentioned I find that the acanthostrongyla are decidedly more slender in R.N. CXXVII. 2 than in the type, but the entire spiculation appears to be very variable in details and it is useless to multiply names until we know something of the range of this variation.

The sponge bears an extraordinary resemblance in general characters and in skeleton arrangement to a monocrepid Lithistid. It is even conceivable that monocrepid desmas may have originated from such acanthostyles, and the curious way in which ill-defined bands of smooth, slender megascleres run through the main skeleton is strongly suggestive of Lithistid affinities.

Register Numbers, Localities, &c. R.N. CXXVII. 2, Mauritius, 23.8.05, 100 fathoms; R.N. CXXXVII. 2, Seychelles, 20.10.05, F. 4, 39 fathoms.

Section Hymedesmieæ.

Ectyoninæ usually of thinly encrusting habit. The principal megascleres typically echinating the substratum. Chelæ when present tridentate (sometimes palmate?). Without well-differentiated symmetrical dermal megascleres.

As a matter of convenience I propose to associate together in this section a number of Ectyonine genera of somewhat doubtful affinities, which may or may not be nearly related to one another. Only three of these are represented in the "Sealark" collection, viz. Hymedesmia, Hymeraphia and Rhabderemia. Hymedesmia appears to be closely related to the Myxilleæ. Most of the others are evidently lipochelous.

Genus Hymedesmia Bowerbank [1864].

Leptosia Topsent [1892 D]; not *Hymedesmia* Carter [1880 B], Topsent [1900], Dendy [1905].

Sponge usually thinly encrusting. Main skeleton composed of usually spined monactinal megascleres, echinating the substratum or arranged in short, plumose columns. Dermal skeleton of bundles or fibres of spicules breaking up into loose brushes at the surface; dermal spicules slender monactinal or more or less symmetrical forms. Microscleres tridentate isochelæ (chelæ arcuatæ or isancoræ) to which sigmata may be added. The microscleres may be absent by reduction.

This extensive genus has been very carefully revised by Lundbeck [1910], who enumerates about 70 species, mostly described by himself. I agree with his conception of the genus in most respects, but I cannot recognize the necessity for separating the forms with so-called "isancoræ" from those with "chelæ arcuatæ," and therefore do not accept his genus *Hymenancora*, though it is to this comparatively small section that the only chela-bearing species of the genus in the "Sealark" collection belongs.

The occurrence of lipochelous forms in this genus is extremely interesting and forms a close parallel to the case of the epipolasid Stellettidæ*. The loss of chelæ has taken place in several different species, probably independently, and cannot well be used here as a generic distinction. The "Sealark" collection affords a very beautiful instance of two very closely related species (*H. lævissima* and *H. lipochela*), one with chelæ and the other without.

Lundbeck includes the genus Hymedesmia in his Ectyoninæ, a group which corresponds pretty closely to my Clathrieæ, but the strong tendency of the dermal megascleres in some species to become symmetrically ended indicates a close affinity with the Myxilleæ, in fact the genus appears to represent a transition between these two sections of the subfamily.

69. *Hymedesmia lævissima* n. sp.

(Plate **15**, fig. 1 *a*—*c*.)

Sponge thinly encrusting; where intact covered by a thin, translucent dermal membrane, containing numerous inhalant pores, sometimes at any rate grouped in irregular pore-sieves. Vents apparently rather small, scattered. Surface very minutely hispid. Texture very soft and yielding. The type specimen (R.N. CXXV. 6) covers a large area on an irregular mass of calcareous débris. It is of a dark chocolate brown colour in spirit, but as everything in the same jar, including the label, was stained of the same colour, it is very doubtful how far it is natural to this sponge†. I think, however, that it may be so to some extent, for the specimen contains innumerable brown granules which are probably pigment granules. A second specimen (R.N. CXXVII. 5), from a different jar, has also a deep brown colour, though of a much redder tint, but this again may be due to staining by another sponge in the same jar.

* Cf. Dendy [1916 C, p. 235; 1916 D, p. 41].

† The colour is probably due, chiefly at any rate, to a specimen of *Plocamia massalis* in the same jar (*vide* p. 78).

The main skeleton consists of smooth, stout subtylostyli, echinating the substratum and the foreign bodies in the interior of the sponge, and sometimes arranged in short, plumose columns. There are also loose wisps of slender tylostyli, mostly running towards the surface, where they break up into very loose brushes; a good many of these spicules are scattered tangentially in the dermal membrane and none of them seems to project very far beyond it.

Megascleres:—(1) Entirely smooth, stout subtylostyles (Plate **15**, fig. 1 *a*); usually very slightly curved; usually with a feebly developed, subglobular head; very gradually sharp-pointed at the apex; size very variable, especially as regards length, up to about 0·66 by 0·02 mm.

(2) Smooth, slender tylostyles (figs. 1 *b*, 1 *b'*); straight; with fairly well developed, but often irregular, oval heads; apex various, commonly abruptly truncate with small central mucro. Size up to about 0·4 by 0·006 mm. The characteristic dermal spicule.

Microscleres:—Tridentate isochelæ (isancoræ) (fig. 1 *c*); with lateral teeth well separated from shaft; shaft stout, strongly curved, with lateral fimbriæ; length about 0·0287 mm. These spicules are very numerous and very uniform in size and shape.

In boiled out preparations a very few small, slender acanthostyles were observed. I have not been able to find them *in situ* and they are altogether so scarce that I am constrained to regard them as foreign. They are almost entirely absent in the type. Of course other foreign spicules also occur.

Of previously described sponges the species that comes nearest to this one appears to be Hentschel's *Hymenancora lundbecki* [1912]; but in that species the stout tylostyles are basally spined and sigmata are present in addition to the isochelæ. Hentschel describes the dermal spicules as tornostrongyla, but his figure shows that they are really bluntly pointed tylostyles. As far as I am aware the entirely smooth character of the megascleres distinguishes *H. lævissima* from all previously known species of Hymedesmia (including Hymenancora) and I was strongly tempted to propose a new genus based on this character. The intermediate condition of the stout tylostyles in *H. lundbecki*, however, finally decided me against such a course. *H. lævistylus* Lundbeck [1910] is another species in which the acanthostyles are almost smooth.

Register Numbers, Locality, &c. CXXV. 6, CXXVII. 5, Mauritius, 23.8.05, 100 and >100 fathoms.

70. *Hymedesmia lipochela* n. sp.

(Plate **6**, fig. 3; Plate **15**, fig. 2*a*—*b*.)

The sponge as a whole (Plate **6**, fig. 3) is massive, proliferous, coarsely cauliflower-like in its mode of growth. It contains a great deal of coarse, calcareous sand, much of which appears on the surface, more or less covered over by the thin, translucent dermal membrane. Vents represented by a few rather small, scattered, circular openings in the dermal membrane. Inhalant pores scattered in the dermal membrane, sometimes in indistinct rounded areas. Colour in spirit brownish grey. The entire specimen measures 57 mm. in greatest breadth and 30 mm. in height in the middle. Its habit suggests an encrusting sponge modified by growing upon loose, coarse sand instead of upon a compact,

solid substratum, and thus affords a good illustration of Lundbeck's remark concerning the external form characteristic of the genus—"Sometimes, on account of the manner of growth, assuming a massive appearance, but also then in reality incrusting."

The main skeleton consists of stout, smooth subtylostyli, partly echinating the coarse sand-grains in the interior of the sponge and partly in short, plumose columns running towards the surface. The sand itself is arranged in more or less well defined but irregular tracts. Beneath the surface loose wisps of slender tylostyles run towards the dermal membrane, where they break up into very lax, irregular brushes, with single spicules scattered tangentially in the dermal membrane itself.

Megascleres:—(1) Stout, entirely smooth subtylostyles (Plate **15**, fig. 2 *a*); sometimes quite straight, usually slightly curved; the base slightly enlarged to form a feebly developed, subglobular head; the apex sharply and very gradually pointed. Commonly measuring about 0·43 by 0·017 mm., but often shorter.

(2) Slender tylostyles (fig. 2 *b*); straight; with fairly well-developed oval heads; tapering very gradually to the apex, which is smoothly and more or less finely pointed; size about 0·37 by 0·0068 mm.

Microscleres:—Absent.

Except for the absence of the microscleres and the non-mucronate apices of the slender tylostyles this species agrees very closely in skeleton arrangement and spiculation with *H. lævissima*, the only other species of the genus known in which all the megascleres are completely smooth. There can be no doubt that the two are very closely related and in all probability *H. lipochela* has been derived from some form practically identical with *H. lævissima* by loss of the chelæ. Lundbeck enumerates several other species without chelæ but they are all forms with acanthostyles. Both as regards the smoothness of the megascleres and the loss of chelæ, as well as, to a less extent, in its massive habit, *H. lipochela* constitutes an extreme deviation from the typical condition of the genus and suggests a possible origin for some of the so-called Axinellid sponges. The tendency of the stout subtylostyli to arrange themselves in plumose columns, both in *H. lipochela* and *H. lævissima*, is very suggestive in this connection.

Register Number, Locality, &c. XLIV. 3, Cargados Carajos, 31.8.05, B. 19, 28 fathoms.

Genus Hymeraphia Bowerbank [1864].

Sponge thinly encrusting. Skeleton composed of (1) very long styli or tylostyli arranged vertically and projecting beyond the surface, (2) comparatively short, variously spined acanthostyles arranged perpendicularly on the substratum, (3) smooth styli or oxea in wisps, variously arranged. No microscleres.

The only species of the genus identifiable in the "Sealark" collection is the curious British form described by Bowerbank as *Hymedesmia radiata*. This species formed the type of Gray's proposed genus *Epicles* [1867 F] but it seems really to be a Hymeraphia, as pointed out by Hanitsch [1894].

71. *Hymeraphia radiata* (Bowerbank).

Hymedesmia radiata Bowerbank [1866, 1874, 1882].
Epicles radiatus Gray [1867 F].
? *Myxilla radiata* Topsent [1892 c].
Hymeraphia radiata Hanitsch [1894].

The material in the collection forms a very thin crust upon some flat fragments of molluscan shell (?). The colour in alcohol is grey. The surface is strongly hispid and the hispidation is of two kinds, (1) long, due to the large tylostyles, which project for a long distance beyond the surface but singly and at considerable intervals; (2) short, due to the projection of the radiate brushes of oxea which surround the large tylostyles.

The skeleton arrangement is highly characteristic. In the first place the substratum is echinated by close-set acanthotylostyles, which project from it more or less at right angles. In the second place the surface is hispidated by the strongly developed, radiate brushes of large oxea, well separated from one another and each typically with a single huge tylostyle projecting outwards from its centre.

Spicules:—(1) Acanthotylostyles; straight, with rather well-developed spherical heads and abruptly sharp-pointed apices; thickly covered, almost up to the extreme apex, with moderate-sized, sharp, thorn-like spines, those on the shaft curved towards the head and those on the head curved towards the shaft. Size very variable, up to about 0·33 by 0·017 mm. (exclusive of spines).

(2) Smooth tylostyles; very long, nearly straight; base enlarged to form a well-marked spherical head; apex rounded off very bluntly. These spicules are very apt to be broken off short, but I have measured them (entire) up to 2·75 mm. in length, with a shaft-thickness of 0·046 mm.

(3) Oxea; smooth; straight or nearly so; with both ends fairly gradually and sharply pointed; one end perhaps a little thicker than the other, but not conspicuously asymmetrical. Size about 0·83 by 0·017 mm.

This sponge differs from the British form described by Bowerbank only in slight details as to the shape and possibly as to the size of the spicules. Thus the large styli or subtylostyli of the British form are represented here by tylostyles with well-developed heads. The blunting of their apices is also perhaps a distinguishing feature. Again, the spines on the acanthotylostyles appear to be much more strongly developed in the Indian Ocean form. The arrangement of the skeleton is probably identical in the two cases, although very imperfectly described by Bowerbank, who worked on dry material in which the projecting character of the large styli was apparently no longer recognizable. There is no sufficient reason for separating the Indian Ocean form specifically from the British one.

I am very doubtful, however, whether the sponge referred to by Topsent [1892 c] as *Myxilla radiata*, and identified by him with Bowerbank's species, really belongs to this species at all.

Previously known Distribution. British Seas (Bowerbank). ? North Atlantic (Topsent).

Register Number, Locality, &c. XIII. 2, Saya de Malha, 4.9.05, C. 3, 123 fathoms.

Genus Rhabderemia Topsent [1892 c].

Encrusting or massive Ectyoninæ in which the principal megascleres are styli with strongly bent base, shaped like a hockey-stick, and the principal microscleres are contorted sigmata. There are no chelæ and the echinating spicules are greatly reduced or absent.

72. *Rhabderemia pusilla* (Carter).

Microciona pusilla Carter [1876].
Microciona minutula Carter [1876, Description of Pl. xvi].
Microciona pusilla Topsent [1889].
Rhabderemia pusilla Topsent [1892 c].

This species is represented in the collection by a small fragment found attached to a specimen of *Spongosorites salomonensis* (R.N. cxvi.), in the form of a shred of membrane containing the characteristic spicules of the species. Carter's original description leaves much to be desired and his type specimen is unfortunately not to be found in his cabinet of microscopic preparations. Topsent, although he has re-described and figured the spiculation, gives no measurements. It seems desirable, therefore, to give particulars as to the spiculation of the "Sealark" specimen. All the spicules agree very closely with Topsent's figure.

Megascleres:—(1) Styli ("Rhabdostyles" of Topsent); smooth (or very nearly so), stout, perfectly straight except at the base, which is very abruptly bent to one side in a spiral of about half a turn; stoutest at the commencement of the spiral, which preserves an almost uniform thickness to the rounded basal end; tapering gradually from the commencement of the spiral to the sharply pointed apex. Size rather variable, say about 0·2 by 0·011 mm., and thus agreeing well enough with Carter's figure, though not with his measurement.

(2) Long, slender styli or subtylostyli; straight or nearly so, perhaps very slightly roughened; measuring about 0·164 by 0·0013 mm.

Microscleres:—Strongly and irregularly contort sigmata; rather slender; measuring up to about 0·0164 mm. in greatest length in a straight line from bend to bend.

A number of large sigmata, showing serration and probably belonging to a species of Paresperella, also occur in the preparation, together with a number of short, stout oxea. All these I regard as foreign bodies.

Previously known Distribution. Tropical Seas? (Carter); Campeachy Bank, Gulf of Mexico (Topsent).

Register Number, Locality, &c. cxvi. a, Salomon b, 3.7.05, 60—120 fathoms.

Section Myxilleæ.

Ectyoninæ in which the megascleres are more or less sharply differentiated into two categories—deep and dermal. The deep megascleres form the main skeleton and are usually monactinal. The dermal megascleres, which need not be confined to the surface, are typically symmetrical or subsymmetrical. The typical microscleres are tridentate (or polydentate) isochelæ.

It appears to me that the group Myxilleæ as accepted by Lundbeck [1905], for example, is far too comprehensive.

The presence of more or less symmetrically ended dermal megascleres alone cannot form a sufficient justification for forming such a heterogeneous assemblage, as such spicules may very well have arisen over and over again in the course of phylogeny. If, however, we associate with this character the presence of tridentate (or polydentate) isochelæ and exclude from the group those genera in which either of these characters is wanting (except of course secondarily), we are left with a compact and fairly homogeneous section of the Ectyoninæ.

Genus Plumohalichondria Carter [1876].

Main skeleton composed of plumose columns of acanthostyles, which may form a reticulation, with or without spongin. More or less symmetrically ended megascleres are present, most typically in the axis of the skeleton columns, sometimes also in surface brushes or scattered. Typical microscleres tridentate isochelæ.

This genus is evidently very closely related to Myxilla, differing only in the arrangement of the megascleres in plumose columns or fibres cored by the smooth symmetrical or subsymmetrical forms.

The type species of the genus is Carter's *P. microcionides* [1876], which, as Thiele [1903 a] has shown, is almost certainly identical with Schmidt's *Desmacidon neptuni*. Hallmann [1912] has suggested that the microscleres of *P. microcionides* may be really "ancoræ," while those of Lendenfeld's genus Clathrissa are "chelæ arcuatæ," and that on this ground these two genera may be kept distinct. It appears to me that we have here an illustration of the difficulty which is likely to result from the attempt made by some recent authors to draw a sharp line of distinction between these two types of spicule. I have never been able to satisfy myself as to the validity of this distinction; it appears to be mainly a question of the extent to which the lateral tooth is cut away from the shaft. I find from examination of Mr Carter's type slide that there are two kinds of chelæ in *P. microcionides*, large and small. In both the lateral teeth are well cut away, which would certainly seem to bring them within the category of "ancoræ."

P. microcionides is a deep sea form and its spiculation, as might be expected, has peculiarities, but at present I can see no reason why a separate genus should be made for the shallow water species.

73. *Plumohalichondria clathrodes* n. sp.

(Plate **4**, fig. 2; Plate **15**, fig. 3 *a—d*.)

There are three specimens of this sponge in the collection. The largest (R.N. cli.), which must be regarded as the type of the species, has been dried (Plate **4**, fig. 2). It is stipitate and flabellate, both stem and lamina being made up of a great number of anastomosing trabeculæ which for the most part run longitudinally and project on the surface as prominent ridges. The entire sponge is flattened in one plane, and the lamina has an almost circular outline. The total height of the sponge is about 280 mm.; the maximum breadth about 220 mm.; the average thickness of the lamina about 15 mm. The stem is short, thick and irregular, and has several points of attachment below. Vents and pores not recognizable. Colour rather dark brown; texture tough and fibrous.

A second specimen (R.N. XLII. 14) is also lamino-clathrous but not nearly so much in one plane, while the margins tend to run out into short branches. Colour in spirit pale greyish yellow; texture compressible, resilient, very tough.

A third specimen (R.N. XLI) encrusts extensively the branches of a red Alcyonarian, but is beginning to grow out into a lamino-clathrous structure in one place.

The main skeleton is an irregular network of stout horny fibre, abundantly echinated by acanthostyles and typically cored by the smooth, subsymmetrical megascleres. The extent to which the coring spicules are developed, however, varies greatly, so that while they are very numerous in some places they may be entirely absent in others in the same specimen. The fibres may be as much as 0·26 mm. thick; they often pursue a sinuous course and often have the plumose appearance characteristic of the genus.

There is no well-defined dermal skeleton but numerous spicules, chiefly tornota, occur scattered in the dermal membrane.

R.N. XLII. 14 contains a considerable quantity of sand, which shows a tendency to be arranged in more or less definite tracts.

Megascleres:—(1) Tornota (Plate **14**, fig. 3 *a*); smooth, slender, straight or slightly crooked; ends typically hastate; usually (? always) slightly unequal, with one a little swollen; one or both may be slightly mucronate; size about 0·176 by 0·004 mm.

(2) Acanthostyles (fig. 3 *b*); straight or nearly so; fairly strongly and uniformly spined except for the apical portion, which is smooth and drawn out to a fine point; size variable, up to about 0·16 by 0·008 mm.

Microscleres:—Tridentate isochelæ (chelæ arcuatæ) of the usual Myxilla type (fig. 3 *c*); with stout, strongly curved shaft and short teeth; about 0·025 mm. in total length. Numerous smaller and especially more slender isochelæ also occur (fig. 3 *d*). These are of exactly the same type as the larger ones and should perhaps be regarded merely as very feebly developed examples.

The robust, clathrous external form and the very strong development of spongin may perhaps be regarded as distinguishing features of this species. Except for the presence of the microscleres it closely resembles *Clathria indica*, a common Ceylon species [Dendy 1889, 1905] which should probably be referred to the genus Plumohalichondria, rather than Clathria, as a lipochelous form.

Register Numbers, Localities, &c. XLI., XLII. 14, Cargados Carajos, 30.8.05, 30 fathoms; CLI., Seychelles.

74. *Plumohalichondria gardineri* n. sp.

(Plate **2**, fig. 9; Plate **15**, fig. 4 *a*—*d*.)

The single specimen in the collection (Plate **2**, fig. 9) has the form of a thick, erect, sessile lamella, which appears to have grown vertically upwards from a narrow, elongated base, which has been discontinuously attached to the substratum. The margin of the sponge is comparatively thin and crest-like, but well rounded off, while the middle of the lamella is very much thicker, owing chiefly to a large swelling on one side, which may indicate a tendency to proliferation. The entire lamella has a somewhat undulating character, especially obvious along the margin. The surface is nearly smooth, but uneven and granular. The vents are minute and inconspicuous; a few occur in small, irregular groups

along the margin. The inhalant pores are apparently in sieve-membranes covering over the small subdermal cavities, which are thickly scattered over both surfaces of the lamella. The texture is compact and solid, only slightly compressible. Colour in spirit, dull yellowish grey. The maximum breadth of the specimen is 62 mm.; maximum height about 42 mm.; maximum thickness about 24 mm.; thickness at a distance of 5 mm. from the margin about 8 mm.

The main skeleton consists of stout, close-set, plumose columns of large and small acanthostyles, with their bases imbedded in spongin. These columns run approximately at right angles to the surface, branching as they go. They are occasionally connected by short, transverse anastomoses which are echinated, chiefly on the outer side, by acanthostyles, so that nearly all the acanthostyles point outwards. There appear to be no spicules lying in the axes of the columns, but a considerable number of long, slender, smooth styli and oxea are found lying parallel to the spicular columns in the intervening mesoglœa.

There is a special dermal skeleton composed of radiate tufts of long, slender oxea, projecting beyond the surface for the greater part of their length.

Spicules:—(1) Large acanthostyles (Plate **15**, fig. 4 *a*); stout, curved near the base like a hockey-stick, tapering gradually to the sharply pointed apex. Base usually slightly tylote. Spines stout, recurved, confined to the distal portion of the spicule, where they are abundant and extend from the apex for $\frac{1}{3}$ to $\frac{1}{2}$ of the total length. Occasionally a very few small spines occur at the base. These spicules measure about 0·29 mm. in length, with a maximum diameter of about 0·016 mm. They are by far the most abundant and most characteristic spicules in the sponge.

(2) Small acanthostyles (fig. 4 *b*); similar in shape to the large ones, but usually measuring only about 0·1 by 0·006 mm., and with the spines less rigidly confined to the distal portion. Intermediate forms of course occur, but they are not very numerous.

(3) Very long, slender, smooth styli (fig. 4 *c*); slightly curved; measuring about 1·0 by 0·012 mm. Scarce.

(4) Long, slender, smooth oxea (fig. 4 *d*); slightly curved; usually gradually and finely pointed at one end and blunt or tornote at the other, but sometimes gradually and finely pointed at both ends. Size about 0·45 by 0·007 mm.

There are no microscleres.

This species appears to be a lipochelous Plumohalichondria and might therefore be mistaken for an Echinodictyum; the plumose skeleton, however, and the apparently secondarily symmetrical character of the "oxea" indicate that its true affinities are with Plumohalichondria. The same remarks apply to my *Echinodictyum gorgonioides* from Okhamandal [1916 A], which should be known as *Plumohalichondria gorgonioides*.

Register Number, Locality, &c. CIII. 1, Amirante, 18.10.05, E. 25, 44—20 fathoms.

Genus Myxilla Schmidt [1862].

The spicules of the main skeleton are acanthostyles, some of which may be echinating. The skeleton fibres are not cored by the smooth, more or less symmetrical, dermal spicules. The characteristic microscleres are tridentate isochelæ.

75. *Myxilla incrustans* (Johnston).

Halichondria incrustans Johnston [1842] (*fide* Bowerbank).
Halichondria saburrata Johnston [1842] (*fide* Bowerbank).
Halichondria incrustans Bowerbank [1866, 1874].
Halichondria incrustans Schmidt [1866].
Dendoryx incrustans Gray [1867 F].
Desmacidon incrustans Vosmaer [1880].
Not *Halichondria incrustans* Carter [1884 F].
Dendoryx incrustans Topsent [1888 B, E].
Dendoryx incrustans var. *typica* Topsent [1888 E].
Dendoryx incrustans var. *viscosa* Topsent [1888 E, 1892 C].
Myxilla incrustans Levinsen [1893].
Dendoryx incrustans var. *australis* Topsent [1901].
Myxilla incrustans Topsent [1913].

(For other possible synonyms *vide* Johnston [1842] and Topsent [1901].)

This widely distributed and very variable species is represented by a considerable amount of material which forms a very extensive but thin crust spreading over an agglomeration of lamellibranch shells and other objects from Praslin Reef. There is a thin, glabrous dermal membrane, through which numerous small, rounded, subdermal cavities can be seen, the roofs of which form pore-sieves, but there are no raised pore-areas. Vents? Colour in spirit pale, greyish yellow. Texture soft and compressible.

The skeleton arrangement and spiculation do not seem to differ in any important respect from those of the typical European form except that the isochelæ seem to be all much smaller than that figured by Bowerbank. It will be desirable, however, to describe the spiculation in detail.

Megascleres:—(1) Acanthostyles; most abundantly spined at the base, smooth at the apex, which is gradually and sharply pointed. Straight or very slightly curved. Size about 0·16 by 0·008 mm. These spicules are partly arranged in a sub-isodictyal network with plurispicular meshes, partly in long, loose, plurispicular primary lines; but the whole skeleton is very irregular.

(2) Straight, slender strongyla or tornota, either rounded at the ends or simply mucronate, size about 0·16 by 0·003 mm. The characteristic dermal spicule.

Microscleres:—(1) Tridentate isochelæ (isancoræ), varying up to about 0·02 mm. in length; scarce.

(2) Slender sigmata; simple and contort; varying greatly in size, up to about 0·032 mm. from bend to bend; very numerous.

The unimucronate terminations of the dermal spicules would place this form in Topsent's var. *typica*, which appears to be the form described by Johnston and Bowerbank, but the species is evidently a very variable one and requires careful comparative investigation of forms from different parts of the world.

Previously known Distribution. North Atlantic, European Seas (Johnston, Bowerbank, Topsent, &c.); Antarctic (var. *australis*, Topsent).

Register Number, Locality. XLVI., Praslin Reef.

76. *Myxilla arenaria* Dendy [1905, 1916 A].

There is a single specimen of this sponge in the collection. It is remarkable in that the sand, with which it is densely charged, is entirely or almost entirely calcareous, so that the entire sponge has an opaque white appearance. As the sand disappears on treat-

ment with acid it is easy to get clean spicule preparations; otherwise it would not be easy to find the echinating acanthostyles, which are very rare and were entirely overlooked at first. The spiculation agrees very closely with that of the Ceylon type.

Previously known Distribution. Gulf of Manaar, Ceylon Seas, Okhamandal (Dendy).

Register Number, Locality, &c. XLIV. 4, Cargados Carajos, 31.8.05, B. 19, 28 fathoms.

Genus Hamigera Gray [1867 f].

The main skeleton is composed of smooth monactinal megascleres. Typical microscleres tridentate isochelæ.

The genus was proposed by Gray for Schmidt's *Cribrella hamigera*, the name Cribrella being preoccupied. Schmidt's description of the species is not very satisfactory and leaves one in some doubt about the character and arrangement of the symmetrically ended (dermal) megascleres, but it is extremely unlikely that the species differed in this respect from Myxilla. Schmidt also does not say that the megascleres are smooth, but the presumption is that he would have mentioned it had they been otherwise, and Vosmaer [1880] accepts them as such. If these views be accepted it is quite clear that Topsent's genus Lissodendoryx [1892 c] must be suppressed in favour of Hamigera.

It may well be doubted whether Hamigera ought to be separated from Myxilla, for all gradations between smooth and spined styli occur in these sponges, as Lundbeck [1905] has pointed out, but I think it will facilitate the arrangement of the species if we keep them distinct for the present.

As to Lundbeck's contention (*loc. cit.*) that Lissodendoryx can be distinguished from Myxilla by the fact that its chelæ are "chelæ arcuatæ," while those of Myxilla are "ancoræ," I need add nothing to what I have already said on this subject.

77. *Hamigera papillata* n. sp.

(Plate **15**, fig. 5 *a—c*.)

Sponge massive, compact, cushion-shaped, sessile, attached to a Stelletta*, which it almost concealed. Upper surface rather thickly covered with low, rounded, flattened papillæ, up to about 1·5 mm. in diameter, irregularly scattered. These are raised pore-areas; they are frequently blocked by an accumulation of sand-grains. Vents rather small, scattered, not prominent. The single specimen measures about 44 mm. in transverse diameter and 30 mm. in thickness. The lower surface contains much coarse sand. The texture is soft and compressible, not very resilient. Colour in spirit greenish grey.

The main skeleton is a very irregular reticulation of very lax, ill-defined spicular fibre and single spicules, the fibres running towards the surface. In the deeper parts of the sponge the spicules are smooth styli, which give place to loose wisps of tylota towards the surface.

The dermal skeleton consists of tylota, scattered tangentially in the dermal membrane between the pore-areas, but arranged in radial tufts both in and around the pore-areas themselves, in such a manner that these areas are subdivided by the tufts into smaller areas in which the pores lie.

* R.N. XIX. 5, a hitherto undescribed species which escaped observation when I was dealing with the other "Sealark" Stellettids.

Megascleres:—(1) Smooth tylostyli (Plate **15**, fig. 5 *a*); moderately stout; usually slightly curved towards the base and with fairly well developed, oval heads; rather abruptly sharp-pointed at the apex. Size about 0·35 by 0·01 mm.

(2) Slender tylota (fig. 5 *b*); straight or nearly so; with fully developed oval heads; entirely smooth; size about 0·3 by 0·005 mm.

Microscleres:—Tridentate isochelæ (chelæ arcuatæ) (fig. 5 *c*), with stout, strongly curved shaft. Length about 0·028 mm.

This species would undoubtedly fall into Topsent's genus Lissodendoryx, both as originally defined by that author and as understood by Lundbeck [1905]; that is to say, it possesses perfectly smooth styli and "chelæ arcuatæ." It is distinguished from some species of that genus by the presence of raised pore-areas and the absence of sigmata, but in both these characters it agrees with Schmidt's *Cribrella hamigera*, the type of the genus Hamigera.

Register Number, Locality, &c. XIX. 1, Providence, 4.10.05, D. 4, 50—78 fathoms.

Genus Forcepia Carter [1874].

Myxilleæ in which the typical megascleres are smooth styli and tylota. Microscleres tridentate isochelæ and forcipes, to which sigmata may be added.

The presence of the essentially dermal tylota and the tridentate isochelæ suggests that this genus should be placed near Myxilla. It is evidently very closely related to Topsent's *Leptolabis* [1904 A], which still retains acanthostyles, and it is extremely interesting to notice that Lundbeck [1905, p. 208] has actually found acanthostyles in the embryo of *Forcepia thielei*, though there appear to be none in the adult, which seems to indicate quite clearly the Ectyonine origin of the genus.

78. *Forcepia stephensi* n. sp.

(Plate **15**, fig. 6 *a*—*e*.)

The sponge forms a very thin crust growing amongst other organisms on the surface of a fistula of Phlœodictyon. Its boundaries are indistinguishable by the naked eye but apparently it extends over a considerable area. The colour in spirit is light yellowish grey.

The skeleton consists of loose fibres and wisps of megascleres, some running towards the surface, where they spread out into ill-defined surface brushes, and some parallel with it, the whole very lax and irregular, with numerous spicules scattered between the wisps and fibres.

Megascleres:—(1) Tylostyli (Plate **15**, fig. 6 *a*); straight, very slender, usually bluntly pointed at the apex and with feebly developed oval heads; with much eroded axial canals; size about 0·2 by 0·002 mm. These spicules appear to be almost vestigial; they occur scattered and in loose fibres or wisps.

(2) Tylota (fig. 6 *b*); equal-ended, with long and rather slender shaft and well-developed heads broadly rounded at the ends; entirely smooth; size about 0·28 by 0·004 mm. These spicules are more numerous and better developed than the tylostyles; they occur chiefly in loose fibres or wisps, also scattered in the dermal membrane and elsewhere.

Microscleres:—(1) Tridentate isochelæ (chelæ arcuatæ) (fig. 6 *c*) of peculiar form. The whole spicule is very short; the shaft is very broad and strongly curved, expanding at the two ends, which are semicircular in outline and bear each three very short teeth. Total length about 0·015 mm.; breadth at the two ends 0·01 mm.; breadth of shaft in middle 0·007 mm. These spicules closely resemble those of *Forcepia crassanchorata* as figured by Carter but the teeth seem to be rather shorter and the shaft perhaps rather broader.

(2) Sigmata (fig. 6 *d*); small, slender, perhaps always more or less contort but sometimes only very slightly so; of quite ordinary form; measuring about 0·014 mm. from bend to bend.

(3) Forcipes (fig. 6 *e*); very slender, hairpin-like, with the two arms closely approximated towards the point of junction and more widely divergent towards the extremities; very slightly roughened, ends sharply pointed; length of the arms about 0·057 mm. These spicules are extremely abundant but the two arms are usually broken apart at the very sharp bend so that they look like simple trichites or raphides. I have already [1896] recorded a similar phenomenon in the case of the forcipes of my *Forcepia carteri* from near Port Phillip Heads.

This species is evidently very nearly related to Carter's *Forcepia crassanchorata* [1885] from southern Australia. The latter, however, is a large, massive sponge and there are probably well-marked differences in spiculation. Thus it is extremely doubtful whether *Forcepia crassanchorata* contains sigmata, while it is almost certain that it possesses a second form of isochela.

I have much pleasure in naming this species after the well-known Dublin spongologist Miss Jane Stephens, in recognition of her excellent work.

Register Number, Locality, &c. LXXXII. A, Cargados Carajos, 3.8.05, B. 19, 28 fathoms.

79. *Forcepia* (?) sp.

In a boiled out spicule-preparation of *Cinachyra providentiæ* n.sp. occur two very fine forceps-spicules closely resembling those of *Forcepia fabricans* and *F. topsentii* as figured by Lundbeck [1905]. The arms are stout, covered with recurved spines, and terminate in well-developed hemispherical discs. The bend of the spicule is well rounded and the arms do not diverge very widely. The larger of the two spicules measures 0·06 mm. in length of arm and 0·008 mm. in thickness at the bend; the diameter of the terminal discs, which appear to have slightly toothed margins, is about 0·009 mm.

Register Number, Locality, &c. XXI. 1 A, Providence, 3.10.05, D. 1, 39 fathoms.

Section Crelleæ.

Ectyoninæ which are characterized chiefly by a more or less dense skeleton of tangentially placed acanthostyles or acanthoxea. Smooth, symmetrically or asymmetrically ended megascleres are commonly present in the choanosome. Tridentate isochelæ may be present.

I include in this section the genera Pytheas Topsent [1890], Yvesia Topsent [1890], Crella Gray [1867 F], Crellina Hentschel [1914] and Pseudoclathria Dendy [1897], which seem to form a fairly natural group closely related to the Myxilleæ. Most of them are

lipochelous but tridentate isochelæ are present in Pytheas and Yvesia. The invasion of the dermal membrane by acanthostyli and acanthoxea, apparently derived from echinating acanthostyles, is very remarkable. Typical echinating acanthostyles remain in Pytheas and Crellina, and in some species (of Yvesia at any rate) the transition from acanthostyli to acanthoxea is clearly seen. I cannot, therefore, agree with Topsent [1892 c] and Lundbeck [1910] in placing such genera amongst the Esperellinæ (Mycalinæ).

The smooth megascleres of typical Crelleæ, which may be either symmetrically or asymmetrically ended, seem to be homologous in some cases with the dermal spicules of the Myxilleæ, though they are now found chiefly in the interior of the sponge.

The occurrence of circular raised pore-areas in some species of Crelleæ also suggests affinity with the Myxilleæ, in which such structures frequently occur.

Genus Yvesia Topsent [1890].

With a well-developed dermal skeleton composed of tangentially placed acanthostyli or acanthoxea. The characteristic choanosomal spicule is a smooth, slender, stylote or oxeote form. Tridentate isochelæ are present.

This genus was established by Topsent with Bowerbank's *Halichondria albula* [1866, 1874] as the type species. In that species the dermal spicules are acanthostyli, but, according to Bowerbank's figure, they already show, in the symmetrical curvature of the spicule and the narrowing of the base, signs of passing into acanthoxea. They are probably derived from the echinating spicules of more typical Ectyoninæ. In other species, such as that about to be described, the acanthostyli are completely, or almost completely, replaced by acanthoxea, the symmetrical form having probably arisen as a result of the new position of the spicule in the dermal membrane, as in the case of the smooth megascleres which seem to have been the original dermal spicules.

The Ectyonine affinities of the genus are further indicated by the isochelæ, which closely resemble those of Myxilla.

80. *Yvesia spinulata* (Hentschel).

(Plate **3**, fig. 8.)

Grayella spinulata Hentschel [1911 a].

This very remarkable species was recently described by Hentschel from S.W. Australia. There can, I think, be no doubt about the identification, but the "Sealark" specimens are evidently much finer than those examined by Hentschel and merit a fresh description. The external form (Plate **3**, fig. 8) ranges from digitate to flabellate, with or without long digitiform processes. The largest specimen (R.N. xlii. 1) has the form of a vertical lamella, giving off irregular digitiform processes, mostly from the margin. It measures about 165 mm. in greatest breadth and 130 mm. in greatest height, with an average thickness of 6 or 7 mm. It has been attached to the substratum at several points along the lower margin by slightly expanded bases. The lamella is fenestrate in several places, owing apparently to the incomplete fusion of ascending branches. The next largest specimen (R.N. xliii. 1 a ; fig. 8) is of about the same height but much narrower. It forms an almost continuous lamella, with an indented upper margin but no digitiform processes, and with one conspicuous oval

fenestra. Its width diminishes gradually below to a narrow base of attachment. A third specimen (R.N. XLIII. 1 B) is very irregular, partly encrusting and partly digitate; sparingly branched. A fourth (R.N. XXXVII.) is apparently very young and encrusts the stem of an alga. All the specimens have a dull red colour in spirit (Hentschel observes that his specimens were either orange-red or grey-violet in alcohol). The texture is fibrous, tough, compressible and resilient. The surface is glabrous.

The extremely characteristic circular and usually slightly raised pore-areas are irregularly scattered on both surfaces of the lamellar specimens; in R.N. XLIII. 1 A they are extremely numerous, but they vary much in number and conspicuousness in different parts of the same specimen. They also vary a good deal in size, being commonly about 2 mm. in diameter. Though typically closed in by the delicate, sieve-like pore-membrane, they often show a single wide opening, evidently due to rupture and contraction of the membrane. This fact has led Hentschel into an obvious error, for he has interpreted these relatively large apertures as probably vents.

The vents are really marginal and situated each on a small conical papilla (Plate **3**, fig. 8). An extensive system of subdermal exhalant canals can be seen through the thin dermal membrane, ramifying and anastomosing between the pore-areas and then converging towards the vents.

The main skeleton consists, in the first place, of a very wide-meshed, irregular network of very stout spicular fibre. The fibres are not very well defined and consist of dense wisps of smooth and spined oxea intermingled. They contain no conspicuous spongin. Between these fibres there is a close, sub-isodictyal reticulation of acanthoxea, single or in bundles.

The dermal skeleton consists, in general, of a dense interlacement of acanthoxea, lying tangentially in the thin dermal membrane. Around the pore-areas, however, and again around the vents, this gives place to a fringe of smooth, radially arranged tornotoxea. The actual sieve-membrane of the pore-areas is almost completely free from spicules, with the exception of isochelæ.

Spicules:—(1) Tornotoxea; usually straight; long, slender, smooth, sharply but subhastately pointed at each end, with no marked asymmetry; size about 0·34 by 0·005 mm.

(2) Acanthoxea; slightly curved, gradually sharp-pointed at each end; fairly thickly and uniformly covered with short, sharp spines; size about 0·13 by 0·0045 mm. Usually these spicules are quite symmetrically ended, I have only once or twice seen one rounded off at one end so as to become stylote.

(3) Tridentate isochelæ (chelæ arcuatæ); characteristic of the pore-sieves; varying much in numbers and in size. I have found them largest and most numerous in the smallest specimen (R.N. XXXVII.), where they measure about 0·025 mm. in length. In the larger specimens they are a good deal smaller.

It thus appears that the spiculation is identical in every respect with that of Hentschel's specimens, and as he has given good figures of the spicules, it is not necessary for me to do so.

Previously known Distribution. Sharks Bay, S.W. Australia (Hentschel).

Register Numbers, Locality, &c. XXXVII., Cargados Carajos, 31.8.05, B. 19, 28 fathoms; XLII. 1, Cargados Carajos, 30.8.05, B. 9, 30 fathoms; XLIII. 1 A, B, Cargados Carajos, 30.8.05, B. 13, 30 fathoms.

Genus Crella Gray [1867 f].

With a well-developed dermal skeleton composed of tangentially disposed acanthoxea (or acanthostyli?). The characteristic choanosomal megascleres are smooth monactinal spicules (styli or subtylostyli) passing into more or less symmetrical forms. No microscleres.

This is a very curious genus, of, at first sight, somewhat doubtful affinities. The sponges comprised therein, devoid of microscleres and with their characteristic acanthoxea, might almost be placed in the genus Higginsia, but at the same time they agree so closely with certain species of Yvesia, such as *Y.* (*Grayella*) *gelida* (Lundbeck) [1910] and *Y. spinulata* Hentschel (*vide* p. 93), in which tridentate isochelæ are present, that one can only conclude that the absence of these spicules in Crella is secondary.

Lundbeck [1910] accepts Carter's genus Grayella in preference to Crella, but, as Vosmaer indicated long ago in Bronn's *Klassen und Ordnungen des Thierreichs*, Grayella must be regarded as a synonym.

81. *Crella cyathophora* (Carter) var. *acuata* nov.

(Plate **15**, fig. 7 *a*—*b*.)

Grayella cyathophora Carter [1869, 1870, 1881 g].
Grayella cyathophora Keller [1889].
Yvesia cyathophora Topsent [1892 c].
Grayella cyathophora Lundbeck [1910].
Grayella cyathophora Topsent [1913].

There are in the collection two small specimens of this curious sponge, both coming from Egmont. They agree very closely in most respects with Carter's original description of the Red Sea type, differing chiefly in the fact that the styli, or subtylostyli, are gradually and sharply pointed, instead of being bluntly pointed, and also show a slight but frequent tendency to become polytylote.

The larger of the two specimens (R.N. cxii. 3) is irregularly lobular, and has attached to its surface a few calcareous foreign bodies; it measures only about 25 mm. in maximum diameter. The surface is deeply and irregularly wrinkled, but this wrinkling is probably due to contraction throwing the dermal membrane into folds. There are two distinct, raised pore-areas, similar to those of the type, and two or three small, conical elevations which may bear vents. The second specimen is very similar, but smaller and more fragmentary; it bears no distinct vents or pore-areas. In both the texture is compressible, resilient and soft, and the colour (in spirit) pale yellowish grey.

The main skeleton consists partly of loose multispicular wisps or fibres, running towards the surface and breaking up as they approach it, and partly of very numerous spicules irregularly scattered in the ground-substance between. The styli or subtylostyli appear to predominate in the fibres and the spined oxea in the intervals between them.

The dermal skeleton is a thin but dense feltwork of spined oxea arranged tangentially.

The spicules are of only two kinds: (1) Styli, or subtylostyli (Plate **15**, fig. 7 *a*) with slightly developed, ovoid heads; long, straight or nearly so, slender; gradually and sharply pointed at the apex; size about 0·3 by 0·005 mm.; (2) Acanthoxea (fig. 7 *b*), slightly curved, fusiform, gradually and sharply pointed at each end, uniformly beset with short, sharp spines; size about 0·12 by 0·005 mm. (exclusive of the spines).

The polytylote character of the styli, though very faintly developed, is especially interesting, because it occurs also in two other related species, viz. *Crella* (*Yvesia*) *carnosa* Topsent [1904 A] and *Yvesia* (*Grayella*) *gelida* Lundbeck [1910], but in both these cases the spicule is diactinal (tornote).

Crella cyathophora was originally described by Carter from material in which the remarkable wart-like, raised pore-areas were much better developed. Since then it has been recorded only by the same writer from the Cape of Good Hope (Port Elizabeth). There are in Mr Carter's cabinet several preparations of the species, some of which evidently come from the type, while one (a dry fragment measuring about an inch square, stuck on a glass slip) must, I think, be from the Cape specimen. The latter differs from the type in its much stouter and more distinctly hastate styli, and may, I think, be regarded as varietally distinct. It is interesting to observe that the styli in this variety occasionally became tornote. Neither in the type nor in the Cape variety have I observed any indication of a polytylote character in the styli. The species is probably very closely related to Schmidt's *Cribrella elegans* [1862] from the Adriatic, the type of the genus.

Previously known Distribution of the Species. Gulf of Suez and Cape of Good Hope (Carter).

Register Numbers, Localities. CXII. 3, Egmont Lagoon; CXIII. 11, Egmont Reef.

Section IOTROCHOTEÆ.

Ectyoninæ in which the typical microsclere is a birotulate isochela (so-called amphidisc). More or less symmetrically ended dermal megascleres are usually present. The sponge is without fistular processes.

I propose to associate with Iotrochota in this section the genera Hymetrochota Topsent [1904 A] and Microtylotella Dendy [1896]. The former includes thinly encrusting sponges which still retain their acanthostyles and may possibly indicate the origin of the typical genus Iotrochota. The latter is a sand sponge with reduced spiculation, in which the microtylota are supposed to represent birotulate isochelæ. Lundbeck has suggested that my genus Amphiastrella [1896] should be associated with Iotrochota, if not actually synonymous, but, for the present at any rate, I prefer to leave it amongst the Cœlosphæreæ. It must be remembered in this connection that the birotulate isochela (amphidisc) has certainly arisen independently in more than one genus (it is present, for example, in Axoniderma Ridley and Dendy [1887]) and it seems more likely that it has arisen independently in Amphiastrella than that this genus is very nearly related to Iotrochota.

Genus IOTROCHOTA Ridley [1884 C].

Sponge usually of dark purple or brown colour. Skeleton reticulate. Megascleres styli (sometimes oxeote), to which more or less symmetrically ended forms may be added, especially towards the surface. No echinating spicules. Microscleres birotulate isochelæ.

82. *Iotrochota purpurea* (Bowerbank).

Halichondria purpurea Bowerbank [1875].
Iotrochota purpurea Ridley [1884 c].
Iotrochota purpurea Topsent [1897 a].
Iotrochota purpurea Dendy [1905].
Iotrochota purpurea Hentschel [1912].

There are several excellent specimens of this species in the collection. They agree very closely, even down to their brown colour in spirit, with the Ceylon specimens collected by Professor Herdman, but I have not seen any of the "pipette" spicules which sometimes occur in the dermal brushes of the latter. R.N. CXXIX. 3 shows very clearly a character which also occurs in the Ceylon material, though I do not think it has previously been recorded in this species, viz. a minute reticulation of the dermal membrane due to the presence of bands of fibrillar tissue dividing it up into small rounded pore-areas, each of which, however, seems usually to contain only a single pore.

Previously known Distribution. Straits of Malacca (Bowerbank); Aru Islands (Hentschel); Amboina (Topsent); Torres Straits, Albany Island, Port Molle (Ridley); Amirante Group (Ridley); Ceylon Seas (Dendy).

Register Numbers, Localities, &c. CIII. 2, Amirante, 18.10.05, E. 25, 44—20 fathoms; CXXIX. 3, Seychelles, 20.10.05, F. 2, 31 fathoms.

83. *Iotrochota baculifera* Ridley [1884 c].

(For Literature and Synonymy *vide* Dendy [1916 a].)

This widely distributed species is represented in the collection by three small specimens: LXXIII. 1 is thinly encrusting, spreading over a mass of calcareous débris, the other two are more massive.

Previously known Distribution. North Australia and Mascarene Islands (Ridley); Gulf of Manaar, Ceylon Seas, Okhamandal (Dendy); Seychelles, Amboina (Topsent); Coast of Cochin China (Lindgren), Celebes, Ternate (Thiele); Christmas Island (Kirkpatrick); S.W. Australia, Aru Islands (Hentschel).

Register Numbers, Localities, &c. XX. 4, Providence, 4.10.05, D. 3, 29 fathoms; LXXI. 6, LXXIII. 1, Amirante, E. 21 and E. 14, 30 and 36 fathoms.

Section ACARNEÆ.

Ectyoninæ with echinating grapnel spicules (cladotylota) and typically with tylota. Characteristic microscleres palmate isochelæ and toxa.

The genus Acarnus is at present the sole representative of this section, but it seems probable that my *Acarnus tenuis* [1896] may represent a distinct lipochelous generic type. The genus is excluded from the Myxilleæ by the form of the isochelæ and from the Clathrieæ by the presence of symmetrically ended, dermal megascleres. The highly characteristic grapnel spicule is, of course, merely a slightly modified echinating acanthotylostyle.

Genus *Acarnus* Gray [1867 f].

The main skeleton spicules are smooth styli and echinating grapnel spicules (cladotylota). The typical dermal spicules are tylota and the typical microscleres palmate isochelæ and toxa.

84. *Acarnus topsenti* n. sp.

(Plate **4**, fig. 3 *a*, *b*; Plate **15**, fig. 8 *a*—*e*.)

The external form of the sponge ranges from simply digitate (R.N. XLII. 12) to compressed, flabellate, giving off longer or shorter digitiform processes (Plate **4**, fig. 3 *a*, *b*). One of the two largest specimens measures about 85 mm. in height by the same in maximum breadth, and consists of five more or less compressed, digitiform processes branching off from one another in the same plane. The average thickness of the processes and of the lamellar portions formed by their union is about 5 mm. The surface is minutely and closely conulose and, where it has been abraded, the conuli appear fused in a meandriniform pattern. A thin, translucent dermal membrane is visible between the conuli in uninjured places. The vents are rather small and mostly on the margins of the branches. One specimen (XLII. 7) shows stellately arranged grooves on one of the flat surfaces and similar grooves running to the margins. These probably indicate subdermal exhalant canals surrounding vents. The texture is compressible, resilient, fibrous, fairly tough. The colour, in spirit, ranges from dull grey to distinctly reddish or purplish, but there is a possibility of staining by other specimens in the same jar in the latter cases.

The main skeleton consists, in the first place, of fairly stout longitudinal main fibres, curving outwards to the surface, where they terminate in tufts of spicules in the surface conuli. These fibres branch freely, at acute angles, on their way to the surface, and the branches may anastomose with one another. They are composed of spongin, very irregularly cored by styli, tylota and grapnel spicules, and echinated by grapnel spicules. The styli are frequently, and especially towards the surface, arranged in a plumose fashion, with their bases embedded in the axis of the fibre and their apices projecting very obliquely. The echinating grapnel spicules usually project more or less at right angles from the surface of the fibre. The primary fibres are also connected, crosswise, by short secondary fibres composed entirely, or almost entirely, of spongin. The diameter of the primary fibres is about 0·08 mm., of the secondaries about 0·025 mm., but they are, of course, variable. The secondary fibres may branch and anastomose, forming a network between the primaries. There is no special dermal skeleton. A few megascleres, mostly tylota, also occur scattered between the fibres.

Spicules:—(1) Styli or subtylostyli (Plate **15**, fig. 8 *a*); tapering gradually from base to sharply pointed apex; straight or slightly curved; sometimes very minutely and sparingly spined at the base, but usually smooth, size about 0·24 by 0·0082 mm. Very slender forms of this spicule occur which are probably young.

(2) Grapnel spicules (clado-acanthostyli) (fig. 8 *b*); straight, tapering gradually from base to apex. Apex provided with usually four (sometimes more) strongly recurved, sharp hooks; shaft, except for a short distance behind the apex, covered with short, sharp, mostly recurved, thorn-like spines; base not itself enlarged but with four or five larger spines curved towards the apex; size about 0·1 by 0·0041 mm. (exclusive of spines).

(3) Tylota (fig. 8 *c*); long, straight, slender; with fairly well-developed oval heads which are sometimes very minutely spined; size about 0·225 by 0·002 mm. (in the middle).

(4) Isochelæ (fig. 8 *d*); palmate, "navicular," very minute, about 0·012 mm. long; may be very abundant.

(5) Toxa (fig. 8 *e*); smooth, strongly arcuate, sharply pointed at each end; very variable in size, commonly about 0·16 by 0·003 mm., often much smaller.

A very large amount of foreign matter occurs in the mesoglœa between the fibres and in some of the fibres themselves, while in other parts the fibres are quite free from it.

This species is evidently closely related to Topsent's *Acarnus tortilis* [1892 D, 1897 A, 1904 A] but differs chiefly in the flabello-digitate external form and the strongly developed horny fibre. The latter character is also exhibited by a very poor, apparently encrusting specimen from Okhamandal which I [1916 A] identified with *A. tortilis*. The spiculation of the Okhamandal specimen, however, agrees more closely with that of *A. tortilis* than with that of *A. topsenti*, and the identification may perhaps stand. In *A. topsenti* the megascleres are decidedly shorter than in *A. tortilis* (the styli very much so) and the grapnel spicule is somewhat different, as will be seen by comparison with Topsent's figures. I lay most stress, however, for the purpose of distinguishing the species, upon the characteristic external form, for, so far as I am aware, *A. tortilis* is always simply encrusting.

Register Numbers, Localities, &c. XXX. 2, XLV. 3, Cargados Carajos, 29.8.05, B. 8, 30 fathoms; XLII. 7, 12, Cargados Carajos, 30.8.05, B. 9, 30 fathoms.

Section TEDANIEÆ.

Lipochelous Ectyoninæ without echinating spicules. With well differentiated, symmetrically or subsymmetrically ended dermal megascleres. Microscleres raphides.

I think there can be little doubt that these are reduced ectyonine sponges. The presence of the characteristic dermal megascleres has led to their inclusion amongst the Myxilleæ by Lundbeck [1910] but I think they deserve to rank as a separate section, of which the characteristic raphides form the chief distinguishing feature of a positive nature.

Genus TEDANIA Gray [1867 F].

With smooth styli for the megascleres of the main skeleton and variously ended but more or less symmetrical megascleres representing the dermal skeleton. The only microscleres are long raphides.

This genus appears to be connected with the Myxilleæ by Topsent's genus Acheliderma [1892 D], which seems to differ from Tedania only in the presence of echinating acanthotylostyles and toxa.

Topsent [1912] has proposed the term "onychetæ (onychètes)" for the characteristic Tedania raphis, but this appears to me to be hardly necessary.

85. *Tedania digitata* (Schmidt) [1862].

(For Literature and Synonymy *vide* Ridley [1884 C] and Ridley and Dendy [1887].)

This widely distributed species has already been recorded from the Indian Ocean by more than one writer. It is represented in the present collection by five specimens, or pieces, of which R.N. XCIV. is an unusually fine example of the species, with a remarkable

external form. It is, as a whole, massive, sessile, with a broad base, and appears as if made up of a large number of more or less completely fused, contorted trabeculæ, which appear on the surface as a number of meandering ridges, with more or less deep sulcæ between them. The whole colony has grown up around a large cloacal cavity, with an enormous vent at the top about 22 by 6 mm. in diameter, with an incomplete membranous margin, like a narrow diaphragm. The entire specimen measures about 65 mm. in height by 70 mm. in breadth at the base. The texture in spirit is soft and compressible; the colour dull yellowish grey.

The spiculation appears to be perfectly typical, as described by Ridley. The minute roughening of the ends of the tylota is very feebly developed, but quite recognizable. The slender raphides are hardly, if at all, roughened, and have no bulbous dilatation. The styli are slightly bent, rather abruptly and fairly sharply pointed. The approximate measurements are as follows:—Styli, 0·2 by 0·006 mm.; tylota, 0·2 by 0·004 mm. (in the middle); raphides, 0·14 by 0·001 mm.

The other specimens call for no special comment, they all appear as if made up of anastomosing trabeculæ.

Previously known Distribution. Almost cosmopolitan.

Register Numbers, Localities, &c. XXX. 1, XLV. 2, Cargados Carajos, 29.8.05, B. 8, 30 fathoms; LXXV. 1, Amirante, 11.10.05, E. 11, 25—30 fathoms; XCIV., Amirante, 11.10.05, E. 13, 20—25 fathoms.

86. *Tedania reticulata* Thiele [1903 B].

I identify with this species two specimens which occur as thin crusts of a yellowish grey colour upon lamellibranch shells. One of them (CXX. 4) shows quite distinctly the minutely reticulate dermal membrane described by Thiele, pierced by the close-set inhalant pores. The spiculation agrees very closely with that of the type, except that the styli are decidedly more slender, measuring about 0·25 by 0·006 mm., as against 0·27 by 0·009 mm. The most characteristic feature of the species appears to be the presence of unusually stout, distinctly roughened, unequal-ended raphides. The knobs of the tylota are well developed and more or less distinctly spined terminally.

Previously known Distribution. Ternate (Thiele).

Register Numbers, Localities, &c. XLIV. 5, Cargados Carajos, 31.8.05, B. 19, 28 fathoms; CXX. 4, Salomon, 10—14 fathoms.

Genus TEDANIONE Wilson [1894].

The styli are completely suppressed, the megascleres being exclusively tylota (or strongyla). The microscleres are raphides, which may sometimes be so stout as to resemble slender oxea and be classed as megascleres.

This genus was proposed by Wilson for a sponge (*Tedanione fœtida*) which he found growing on the roots of the mangrove, in the Bahama Islands, and of which he gives a detailed anatomical account, accompanied by observations on the development. So far as I am aware this is the only species of the genus hitherto described.

In his generic diagnosis Wilson states that the spicules are "mostly oxeas, with

microscleres of same pattern, and a very few tylotes." In his description of the type species he speaks of "stout skeletogenous oxeas $\frac{3.5}{100}$ mm. long and often slightly bent"; unfortunately he does not mention the diameter of these spicules, but his fig. 100 shows that they are really very slender spicules and I have no doubt that they are homologous with the "microscleres of same pattern" (raphides). This view is supported by his fig. 101, showing a "modified oxea" with mucronate apex, a condition which is frequently found (but with more elongated and sharper mucro) in the Indian Ocean species about to be described.

Hallmann [1914] has recently proposed the genus Hemitedania for Carter's *Amorphina anonyma*, in which the only megascleres are apparently genuine oxea, while the microscleres are raphides with a bulb-like dilatation near one end. This peculiar type of raphis is found in some species of Tedania and also occurs in the Indian Ocean species of Tedanione, a fact which strongly supports the view that all three genera, in spite of the differences as regards their megascleres, are closely related.

87. *Tedanione wilsoni* n. sp.

(Plate **16**, fig. 1 *a*—*b'*.)

The single specimen forms a rather thin but extensive crust growing over another sponge (an undetermined Axinellid). The surface is smooth but rather uneven, and under a pocket-lens exhibits a very minutely reticulate appearance. The inhalant pores are scattered in a thin dermal membrane, which is not easily separable and only appears distinctly where it passes over the small, scattered, rounded subdermal cavities. The vents are small, few and scattered (only two recognized), without prominent margins. The texture in spirit is rather soft and compressible, but fairly compact; in places a good deal of calcareous sand is imbedded in the tissues. The colour now is dull greyish yellow.

The main skeleton consists of more or less dense wisps of tylota (or strongyla), with intermingled raphides, running irregularly towards the surface, with a multitude of loose spicules scattered between. There is no properly defined dermal skeleton but the dermal membrane contains numerous scattered tylota (or strongyla) and raphides, lying tangentially.

Megascleres:—Strongyla, or tylota with very feebly developed heads (Plate **16**, fig. 1 *a*); straight or nearly so, and rather slender; quite smooth all over. The proportions of these spicules, which are very abundant, vary somewhat, but they usually measure about 0·29 by 0·0041 mm.

Microscleres:—Raphides (figs. 1 *b*, 1 *b'*); nearly straight or slightly bent, very finely pointed at each end, divided into two very unequal portions by a slight bulbous enlargement, the shorter portion measuring about $\frac{1}{14}$ to $\frac{1}{3}$ of the longer, the apex of the shorter piece often with a very slender, elongated mucro. These spicules appear to be quite smooth. They occur scattered abundantly throughout the sponge and are of two principal sizes, the larger measuring about 0·18 by 0·002 mm. and the smaller about 0·05 by 0·0008 mm. The bulbous dilatation occurs in the smaller as well as in the larger individuals and appears to be a very constant feature.

This species is probably fairly closely related to Wilson's *Tedanione fœtida* from the

Bahamas [1894] but differs in several important particulars. The "skeletogenous oxeas" of Wilson's species, which I interpret as homologous with the larger raphides of *T. wilsoni*, are much longer than in the latter (0·35 mm.) but at the same time evidently very slender, and none of the raphides appear to have bulbous dilatations. The tylota, again, are very rare, while in our species they are very abundant.

Register Number, Locality, &c. xx. 6, Providence, 4.10.05, D. 3, 29 fathoms.

Section Cœlosphæreæ.

Ectyoninæ with a strongly differentiated ectosome containing tangentially disposed megascleres and forming a more or less easily separable rind enclosing the often pulpy choanosome. The ectosome is produced into hollow, cylindrical fistulæ. Typical megascleres tylota, which may be replaced by some other more or less symmetrically ended form and supplemented by monactinal forms. Echinating spicules usually absent or vestigial. Microscleres typically including chelæ, which may, however, be suppressed.

For reasons already given (p. 45) I have decided to keep this group of sponges distinct from the Phlœodictyinæ and to regard the resemblance between the two as due to convergence. I derive the name of the section from Wyville Thomson's genus Cœlosphæra [1873]. This important genus was proposed for the reception of a remarkable sponge (*Cœlosphæra tubifex*) collected by the "Porcupine" expedition. A brief description, together with an admirable figure of the external form, was published in that well-known work *The Depths of the Sea**.

In 1874 Carter described his "*Histoderma appendiculatum*, n. gen. et sp.," actually from the "Porcupine" material. Why he ignored Wyville Thomson's earlier description and name is to me a complete mystery, for there can be no doubt that he was acquainted with them. He refers to Wyville Thomson's *Depths of the Sea* in his own paper, and a type slide of "*Histoderma appendiculatum*" in his cabinet bears the alternative name "*Cœlosphæra tubifera* [*sic*] Wy. Thomson," with a reference to Thomson's description. Indeed, in the last of his papers on the "Porcupine" sponges, published some two years later [December 1876, p. 472], he actually gives, though with a quite unnecessary query, *Cœlosphæra tubifex* Wy. Th. as a synonym of *Histoderma appendiculatum*.

Almost more remarkable is the fact that no one has ever since, so far as I know, noticed this very obvious synonymy. Carter's name has been very generally, if not universally accepted, but I think there cannot be the least doubt that the laws of nomenclature require that we should revert to *Cœlosphæra* for the name of the genus and *tubifex* for that of the type species. According to Carter a large style ("acuate") forms part of the spiculation of this species, but an examination of his preparations has driven me to the conclusion that if such a spicule occurs at all its presence is abnormal.

An interesting discussion of the genera which may be assigned to this section is given by Lundbeck [1910, pp. 25, &c.], who seems, however, to have been quite ignorant of Wyville Thomson's Cœlosphæra. Without adopting a special group for their reception he associates together and accepts the genera Histoderma, Histodermella, Inflatella and Cornulum, placing them all amongst the Myxilleæ. He regards Sideroderma as a synonym of Histo-

* My information is derived from the 2nd edition, published in 1874.

derma and Amphiastrella as a possible synonym of Iotrochota. I cannot follow him in all his conclusions, but I consider that he has done good service in pointing out the probable ectyonine origin of the group. He regards the dermal megascleres as being only secondarily "diactinal" and states that they have a monactinal origin, like the dermal spicules in "other Myxilleæ." He suggests that Histoderma may be derived from some ancestral form such as Hymedesmia, by loss of the acanthostyles, &c. The spiny spicules of Histodermella and the microrhabds of Cornulella probably represent the lost acanthostyles. The most striking evidence in favour of this view is afforded by a species since described by Hentschel [1912] under the name *Cornulum dubium*, which is thinly encrusting, with tubular processes and with fully developed acanthostyles, and thus seems to be strictly intermediate between *Hymedesmia* and *Cœlosphæra*.

It should be pointed out, perhaps, that Lundbeck's views as to the monactinal origin of the "diactinal" megascleres in the Cœlosphæreæ are not supported by the observations of Hallmann [1914] and myself (see under *Siderodermella ramosa*) on the spiculation of the embryos in "Histoderma" and Siderodermella, but I do not think that these observations are by any means fatal to such conclusions.

In this section of the Ectyoninæ we find considerable diversity in the form of the isochelæ, which may be either palmate, tridentate or birotulate. In this case the very peculiar and characteristic structure of the sponge appears to me to outweigh the form of the chelæ in toxonomic value, but the case of the Phlœodictyinæ indicates the possibility that the group may still be polyphyletic.

Genus Cornulella n. gen.

Sponge encrusting or burrowing, with fistular outgrowths. Megascleres tylota. Microscleres palmate isochelæ and microrhabds, to which others may be added.

I at first assigned the type species of this genus to Lundbeck's genus Histodermella, but, apart from its palmate isochelæ, it differs from that genus in the possession of microrhabds. It seems quite possible, however, that these spicules really represent vestiges of the acanthoxea or acanthostrongyla which occur in Histodermella and which Lundbeck regards as megascleres. It must be remembered that the distinction between megascleres and microscleres is in many cases purely arbitrary. The presence of the microrhabds, and perhaps also the habit of the sponge, serve to differentiate the genus from Cornulum.

88. *Cornulella lundbecki* n. sp.

(Plate **16**, fig. 2 *a*—*d*.)

The sponge forms a thin crust occupying irregular depressions on the surface of a mass of nullipore and other calcareous débris and growing out here and there into delicate, thin-walled fistulæ. The fistulæ are cylindrical and about 2—3 mm. in diameter. The longest remaining measured about 13 mm. in length. They are much damaged, but it seems probable that some of them normally have wide openings at the extremity while others end blindly. The wall of the fistula spreads out at the base into a thin, bladder-like dermal membrane, which covers the general surface of the sponge where exposed. The body of the sponge appears nowhere to attain any considerable thickness as an independent

growth but it penetrates deeply into the interior of the mass of calcareous débris, through which it can readily be traced by its very characteristic, deep purple colour. This colour is evidently natural to the sponge, for other sponges growing in the same mass are unstained. It seems to be insoluble in alcohol and it occurs chiefly in the deeper parts of the sponge, leaving the dermal membrane itself sometimes almost colourless. The colour is due to deeply pigmented granules, scattered thickly through the choanosome, mostly in small groups. The basal portions of some of the fistulæ are ornamented with longitudinal stripes of purple.

The skeleton in the interior of the sponge consists of loosely scattered megascleres. In the walls of the fistulæ the megascleres are arranged tangentially and form a rather loose feltwork.

Megascleres:—Tylota (Plate **16**, fig. 2 *a*); slightly curved, with rather feebly developed oval heads which are usually minutely spined, but apparently not always. Size about 0·4 mm. long by 0·006 mm. thick (in the middle of the shaft).

Microscleres:—(1) Large palmate isochelæ (fig. 2 *b*), resembling those of the genus Esperiopsis; about 0·05 mm. in length by 0·012 mm. in greatest breadth. Normally the shaft is not very strongly curved but sometimes it is sharply bent in the middle, with the concavity on the palmar side. This condition apparently results from some restraining influence preventing the straightening out of the shaft. It may be a normal developmental stage, as it occurs frequently. This is a singularly beautiful spicule, and it is very abundant throughout the sponge.

(2) Slender, cylindrical or subfusiform microrhabds (fig. 2 *c*) with blunt extremities and perhaps very slightly roughened surface; measuring about 0·02 by 0·001 mm. Abundant in the interior of the sponge.

(3) Toxa (fig. 2 *d*). Very strongly bent in the middle; arms rather short and strongly recurved, fairly stout and tapering gradually to fine points. Length in a straight line from apex to apex about 0·12 mm., with a thickness in the middle of about 0·0027 mm. I have seen only a very few of these spicules but they have every appearance of being a normal constituent of the spiculation and some of them still retain remains of the enveloping membrane of the silicoblast.

? (4). Sigmata. Some shreds of membrane (in a teased preparation), which may or may not belong to this sponge, contain numerous simple, **C**-shaped sigmata, fairly stout and about 0·18 mm. long. As they are so very strictly localized I am extremely doubtful whether they form a normal constituent of the spiculation or not.

This is a very distinct species, easily recognizable by its beautiful colour and its remarkable spiculation.

Register Number, Locality, &c. CXXVIII. 1 A, Seychelles, 20.10.05, F. 9, 37 fathoms (in association with *Petrosia seychellensis*, a fine specimen of which is attached to the same calcareous mass).

Genus Cornulum Carter [1876].

Sponge with fistular processes (? always); with a thin cortex and pulpy interior. Skeleton chiefly of symmetrically ended megascleres, interwoven tangentially in the cortex and in loose fibres in the interior. Microscleres minute palmate isochelæ, to which others may be added. No acanthoxea, acanthostrongyla or microrhabds.

This genus differs from Cœlosphæra in the palmate character of its isochelæ. Carter mentions a very slender style amongst the megascleres of the type species (*C. textile*) but I doubt if these are not really identical with the toxa which he also describes.

89. *Cornulum strepsichela* n. sp.

(Plate **16**, fig. 3 *a*—*b*.)

This species is represented by a single very thin-walled, cylindrical tube, widely open at both ends; measuring about 12 mm. in length by 3 mm. in diameter. It has very probably been torn off from a central body. It is quite hollow, very translucent in appearance, and has a faint pinkish tinge (in spirit).

The skeleton is a rather loose feltwork of megascleres, lying tangentially in the wall of the tube and crossing one another in all directions.

Megascleres:—Tylota (Plate **16**, fig. 3 *a*); cylindrical, long but fairly stout; with very feebly developed heads; minutely spined at the extremities; measuring about 0·38 by 0·009 mm.

Microscleres:—Small, slender-shafted, palmate isochelæ (fig. 3 *b*), rather like those of Clathria. Frequently contort, so that a front view of one end and a side view of the other appear simultaneously; length about 0·0164 mm., very uniform. These spicules occur in immense numbers in the interstices of the skeleton reticulation in the wall of the tube. They are very similar to those of *Clathria typica* and *Microciona acerato-obtusa* as figured by Hentschel [1911 A], which may also be contort.

Owing to the fragmentary character of the material the reference of this species to the genus Cornulum can only be regarded as provisional.

Register Number, Locality, &c. XC. 1, Cargados Carajos, 1.9.05, B. 29, 45 fathoms.

Genus Siderodermella n. n.

Sideroderma Ridley and Dendy [1886, 1887].

Sponge consisting of tubular processes which may spring from a massive body or form a branching system among themselves. With a dense ectosomal skeleton (spicular cortex) of tangentially placed tylota. Choanosome soft and pulpy, occupying the interior of the sponge but readily contracting away from the wall; with skeleton of scattered spicules. Megascleres tylota only. Microscleres comprising tridentate isochelæ (chelæ arcuatæ) and very minute, navicelliform isochelæ, to which sigmata and trichodragmata may be added.

The name Siderodermella is here proposed in replacement of Sideroderma, R. and D., which was already pre-occupied when the genus was founded.

Lundbeck [1910] accepts the view that Siderodermella cannot be separated from "Histoderma." Although I myself long ago [1896] suggested this possibility it now appears to me that the presence of the peculiar minute, navicelliform isochelæ affords sufficient justification for such separation and this view is strongly supported by the discovery of a second species, with identical spiculation but very different external form, by the "Sealark" Expedition. Hentschel's *Histoderma navicelligerum* var. *aruensis* [1912] probably represents yet a third species, distinguished chiefly by the absence of trichites,

but it is very inadequately described. I agree with Lundbeck that Lendenfeld's *Sideroderma zittelii* [1888 A] does not belong to this genus. Indeed Hallmann [1914] has demonstrated with sufficient clearness that the species in question is really a Polymastia! I also agree with Hallmann that Lendenfeld's record of *Siderodermella navicelligera* from Port Jackson is probably erroneous.

90. *Siderodermella ramosa* n. sp.

(Plate **8**, fig. 6; Plate **16**, fig. 4 *a*—*e*.)

The single specimen consists of an irregularly ramified mass of tubes (Plate **8**, fig. 6), varying greatly in diameter and with no central body. The largest tube, which has become detached from the remainder, measures about 63 mm. in length by about 5 mm. in diameter at the proximal end. Towards the distal extremity it tapers away gradually to a diameter of only 2 mm. It gives off a few short, bud-like branches, one of which immediately subdivides into two. All the tubes now end blindly, and I have recognized no natural openings with certainty*. In the main mass the widest tube is about 8 mm. in diameter and there is a small amount of anastomosis. The wall of the tubes is only about 0·12 mm. thick and very flexible; the interior is partially filled with the soft, pulpy choanosome, more or less contracted away from the wall. The colour in spirit is pale grey and the sponge is much encrusted in places with shell-fragments and other foreign matter.

The principal skeleton is, of course, that of the tube-walls, which consists of a dense feltwork of long tylota crossing one another in various directions, so as to form a spicular cortex about 0·12 mm. thick. In the soft internal choanosome are found very numerous similar spicules, not collected into definite fibres or bundles, though often lying parallel with one another in dense masses.

Megascleres:—Tylota (Plate **16**, fig. 4 *a*); usually slightly crooked, with cylindrical shaft slightly thicker in the middle than elsewhere and terminated at each end by a well-developed oval head. Dimensions, especially thickness, very variable; a well-grown specimen measuring, say, about 0·48 mm. in total length by 0·01 mm. in diameter in the middle of the shaft. The heads of these spicules appear to be always perfectly smooth.

Microscleres:—(1) Tridentate isochelæ (fig. 4 *b*), about 0·02 mm. long. These are "chelæ arcuatæ," with shaft not very strongly curved and lateral teeth separated from it for little more than one-third of their length. Rather scarce.

(2) Minute navicelliform isochelæ (fig. 4 *c*) about 0·009 mm. long. These spicules seem to resemble exactly those described and figured (very badly) in the "Challenger" Report for *Siderodermella navicelligera*. They are extremely abundant.

(3) Fairly large, stout sigmata (fig. 4 *d*); perhaps always more or less contort, sometimes very markedly so, but sometimes C-shaped; measuring about 0·04 mm. from bend to bend.

(4) Small sigmata (fig. 4 *e*), of similar form to the above but perhaps relatively more slender; about 0·02 mm. from bend to bend.

Trichites or raphides, of hair-like dimensions, about 0·246 mm. long and usually collected in large, loose bundles (trichodragmata).

* It is probable, however, that some of them bore terminal vents in life, now closed.

The spiculation of this species appears to be in all essential respects identical with that of *Siderodermella navicelligera*, the type of the genus from New Guinea; such differences as may possibly exist concern merely the dimensions and are quite trifling. The external form of the sponge, however, with its long, branched, tubular processes and the absence of a central body, is so different that I have little hesitation in proposing a new specific name.

The pulpy choanosome of this sponge was found to contain a number of embryos. The largest observed is oval in shape and measures about 0·86 by 0·6 mm. It contains numerous irregularly scattered megascleres. It is interesting to observe that these are all slender, symmetrically ended tylota, measuring about 0·18 by 0·0027 mm. (in the middle of the shaft). Their heads are very well developed, about 0·004 mm. in diameter and nearly spherical, instead of being elongated as in the corresponding spicule of the adult. I have been unable to determine with certainty whether or not microscleres occur in this embryo, those which appear to be associated with it may possibly belong to the surrounding tissues of the adult.

Hallmann [1914] has described similar embryos in the case of his *Histoderma actinioides*.

Register Number, Locality, &c. CXXXIII. 6, Seychelles, F. 9, 37 fathoms.

Section Cyamoneæ.

Ectyoninæ in which the echinating acanthostyles are represented by pseudactinal or pseudastrose spicules.

There can be no doubt about the origin of the very curious pseudactinal spicules in the genus Cyamon, for their development clearly shows that they are modified acanthostyles (cf. Plate **16**, figs. 5*f*—*f*''''). The same origin may safely be attributed to the very similar spicules of Trikentrion (Plectronella) and more doubtfully to the curious "desmoid" spicules of Crambe. The pseudasters of Stelligera Gray [1867 F] and Sclerochalina Schmidt [1868] are indistinguishable in appearance from true asters, but in view of the other characters of these genera it seems more reasonable to assume that these spicules also have originated from the heads of echinating acanthotylostyles than that they have been inherited from astrotetraxonid ancestors.

I therefore propose to include all the above-mentioned genera, provisionally, in the same section, for which the name Cyamoneæ seems most appropriate.

It is obvious that this arrangement involves the abandonment of the family "Astraxinellidæ" which I suggested in 1905 [p. 107] and which has since been accepted by Hallmann [1912] and Stephens [1915].

Genus Cyamon Gray [1867 F].

The principal megascleres are smooth styli, while the echinating acanthostyles are represented by pseudactinal forms resembling tetracts, triacts, &c. No chelæ.

This genus was founded by Gray in 1867 upon Bowerbank's figure and description of a single spicule. The type species, *C. vickersii*, was first described by Carter in 1879, but that author did not take any notice of Gray's genus, making use of Bowerbank's original

name (*Dictyocylindrus vickersii*). Ten years later Topsent [1889] referred the species to the genus Trikentrion, refusing deliberately to recognize Cyamon.

In 1905 I revived Gray's genus and referred to it three species, *Dictyocylindrus vickersii* Bowerbank, *Microciona quadriradiata* Carter and *Microciona quinqueradiata* Carter. The genus has also been adopted by Hentschel [1912] who has described a species which he names *Cyamon aruense*.

The most remarkable feature of the genus is undoubtedly the presence of the curiously modified echinating styli, in which a few of the basal spines have become enormously enlarged to form pseudactines, so that the whole spicule comes to resemble a pentact, tetract, triact or diact as the case may be. This interpretation of the spicule is supported not only by its actual development (cf. Plate **16**, figs. 5*f*—*f*''''') but also by the remarkable case of Topsent's *Hymeraphia spinispinosa* [1904 A], which may possibly represent another species of Cyamon. In this fascinating sponge, a preparation of which I owe to the kindness of Miss Jane Stephens, the echinating spicules are in a condition intermediate between that of an ordinary acanthostyle, or acanthotylostyle, and that of the Cyamon spicule, and, moreover, they are associated with normal acanthostyles. If we may regard the subtylostyles of Topsent's species as representing the curious bulb-bearing styli of Cyamon there seems no reason why we should not include the species in this genus.

As I have already pointed out [1905], the genus Cyamon seems to be closely related to Trikentrion, which represents a further stage in the evolution of the pseudotriact, but differs from Cyamon in that the principal spicules are oxeote.

91. *Cyamon vickersii* (Bowerbank).

(Plate **4**, fig. 4; Plate **16**, fig. 5 *a*—*f*''''')

Dictyocylindrus vickersii Bowerbank [1864].
Cyamon vickersii Gray [1867 F].
Dictyocylindrus vickersii Carter [1879 B].
? *Trikentrion wickersi* Topsent [1889].

There is a beautiful specimen of this rare and remarkable species in the collection, and as it has hitherto been only imperfectly known I propose to give a full description with the necessary illustrations.

The "Sealark" specimen (Plate **4**, fig. 4) has the form of a hemispherical cushion, with a wide and deep cup-shaped cavity excavated slightly excentrically on the convex upper surface. The flattened base is approximately circular in outline and somewhat uneven. It has probably been attached at one or more points. The entire structure of the sponge is strongly columnar and radiate, the stout skeletal columns radiating out from the middle of the base and terminating on the upper surface in prominent, blunt conuli, while the base is radially grooved and ribbed owing to the same cause. The surface conuli are slightly hispid and between them is stretched a smooth, translucent dermal membrane. A similar membrane lines the cup-shaped cavity, the surface of which is devoid of conuli but slightly ribbed radially by the underlying skeleton columns. Neither vents nor pores are recognizable with certainty, but the vents may be represented by a few rather small, scattered apertures in the dermal membrane between the conuli on the outer surface. The diameter of the base of the sponge measures about 28 mm.; the greatest height, to the edge of the cup, is about 19 mm.; the diameter of the opening of the cup is about 17 mm., and the depth of

the cup about 10 mm. The colour in spirit is light brown, shading to dark brown on one side, and is due to the presence of numerous large granular pigment-cells, chiefly in the thin dermal membrane. The texture is firm and stiff, but at the same time compressible and resilient.

The skeleton is composed of stout, plumose columns of spicules, radially arranged and terminating in the surface conuli. Each column is made up chiefly of stout styli and pseudo-tetracts and -triacts. The former in part run longitudinally, in bundles of two or three held together by spongin, but great numbers of them project obliquely from the column, with their apices pointing towards the dermal membrane. The pseudactinal spicules occur in immense numbers between the styli. The columns are separated by intervals about as wide as themselves, containing only a few scattered spicules. There is no special dermal skeleton.

Spicules:—(1) Stout, smooth styli or subtylostyli (Plate **16**, fig. 5 *a*); more or less curved or bent towards the base, which is considerably narrowed, gradually and finely pointed at the apex; size about 0·74 by 0·029 mm. Occasionally strongylote (fig. 5 *b*).

(2) Long, slender, smooth styli, occasionally tylote (fig. 5 *c*), almost straight, tapering very gradually to a finely and evenly pointed apex but not diminishing sensibly towards the base; measured up to about 1·7 by 0·014 mm., but usually somewhat smaller and probably sometimes larger. These spicules are not conspicuous in sections but they occur in small numbers in boiled out preparations.

(3) Comparatively short, slender styli of peculiar form (fig. 5 *d*). These spicules are approximately straight except for (usually) a very characteristic bend at about one-third of the distance from base to apex. At or near this bend there is usually a very slight bulbous inflation (*x*). The spicule is of nearly the same width throughout its length; the base is evenly rounded off and smooth; the apex (fig. *d*″) may be simply and abruptly sharp-pointed (hastate), or it may be slightly enlarged and covered with minute spines, or it may be slightly enlarged without being distinctly spined. These spicules are quite common, though not nearly so numerous as the ordinary styli. Some of them occur scattered singly without any sort of orientation in and between the skeleton columns, others occur in dense bundles resembling enormous trichodragmata. Size of individual spicule commonly about 0·33 by 0·005 mm., but rather variable. A variety without the characteristic bend is shown in fig. 5 *d*′.

(4) Pseudo-tetracts, -triacts, -diacts and -pentacts. These spicules usually have four rays (fig. 5 *e*), of which three lie nearly in the same plane, but inclining upwards to meet one another in the centre, while the fourth lies in a plane at right angles to that of the others. The fourth ray, representing the shaft of the ancestral acanthostyle, is commonly a little different in length and a little more sharply pointed as compared with the other three. The angles between the rays are subject to considerable variation. All four rays in the adult spicule are more or less blunted at the apex and their distal portions are thickly covered with small, sharp spines, which tend to disappear more or less completely towards the centre of the spicule; towards the apices of the rays these spines may be slightly recurved. Numerous forms occur with more slender, smooth and sharply pointed rays (fig. 5 *f*⁗); these are evidently young individuals, they are connected by intermediates

with the adult form. Triact forms (fig. 5 *e''*) seem to be nearly if not quite as common as the tetracts; diacts (fig. 5 *e'''*) are much less frequent and pentacts (fig. 5 *e'*) still less so. Some of the principal developmental stages of this spicule are represented in figs. 5 *f*—*f''''*. It will be noticed that in the earliest stages observed (figs. 5 *f*, *f'*) the "fourth" ray is very much longer than the other rays, a fact that strongly supports the view that the entire spicule is a modified acanthostyle. In the fully-grown spicule the rays are much stouter and their inequality is less pronounced, the "fourth" ray commonly measuring about 0·07 by 0·012 mm. and the others little less. I am inclined to think that the variability in number concerns only the basal rays, which are evidently enlarged spines, but it would be difficult to establish this point. Very young spicules may show indications of several aborted rays (originally spines) in the form of rounded tubercles between the basal rays and near the proximal end of the fourth ray or shaft (figs. 5 *f*, *f'*).

The flagellate chambers are about 0·02 mm. in diameter, subspherical and probably eurypylous. They occur scattered in the highly lacunar, gelatinous mesoglœa between the skeletal columns. In the skeletal columns themselves, between the component spicules, masses of darkly staining, granular cells occur.

There can be very little doubt of the specific identity of our specimen with Bowerbank's original type. Concerning the external form of the latter we know very little, but Carter's description opens with the words "Fragment thick, triangular, wedge-shaped, composed of branched columnar structure, radiating from the inner angle, indicative of its having been broken out of a convex radiated mass." Judging from this account the entire specimen may very well have resembled that obtained by the "Sealark." When, however, Mr Carter goes on to say that the columns are "hollow, tubular, smooth within and rough without, wherein the spicules are implanted," I hardly know what he means, but I think he must be describing some post-mortem effect due to desiccation.

There is in Mr Carter's cabinet a slide labelled "Dictyocylindrus Vickersii—W. Indies" which almost certainly represents the original type. This slide bears, in addition to a number of small fragments, two pieces of skeletal columns, which certainly have the appearance of being tubular, though the appearance is, I believe, deceptive.

The spiculation of our sponge agrees remarkably closely with that of the type, which is not very well represented in Mr Carter's illustrations. Even the curious crookedness, accompanied by a slight bulbous dilatation, of the small styli is faithfully reproduced. The characteristic shape of the apex of this spicule is also the same, but the material at my disposal is not sufficient to enable me to say whether or not the apex is ever spined in the type. It is astonishing to find such minute and apparently meaningless characters reproduced with such fidelity in specimens from such widely different localities.

There can be little doubt that Bowerbank's type came from the West Indies. Bowerbank [1864], it is true, queried the locality ("West Indies?") but Carter and Gray both accepted it without question, and, moreover, Carter mentions another fragment obtained from the West Indies by Mr Higgin*. I have a preparation of this also in the Carter cabinet and, although it consists of only a few spicules, I am satisfied that it represents a specimen of *Cyamon vickersii*. Carter, however, subsequently [1880 B] identified this

* Compare Higgin [1877, p. 296, Pl. XIV. fig. 9].

specimen with his *Microciona* (*Cyamon*) *quadriradiata*, from the Gulf of Manaar, an identification which can, I think, hardly be maintained, unless, indeed, *Cyamon quadriradiatum* should prove to be merely a young, encrusting form of *C. vickersii*.

Topsent [1889] says that the species—which he calls *Trikentrion wickersi*—is common on the Campeachy Bank (Gulf of Mexico) and that it is always more or less encrusting and generally thin. As, however, he does not mention the peculiar bulbous styli it must be considered a little doubtful whether his identification is correct.

Previously known Distribution. West Indies (Bowerbank, Carter, Higgin); ? Campeachy Bank, Gulf of Mexico (Topsent).

Register Number, Locality, &c. CIX., Amirante, 11.10.05, E. 11, 25—30 fathoms.

Sub-family **Axinellinæ**.

Lipochelous Desmacidonidæ in which the skeleton is typically arranged in a plumose fashion. The megascleres are usually stylote, sometimes oxeote. There are no acanthostyles.

The so-called Axinellid sponges have long been felt to form a very unsatisfactory group. The genus Raspailia, formerly included therein, has long since been removed to the Ectyoninæ, on account of the occasional acanthostyles which it possesses. The genera Axinella, Phakellia and Acanthella* may be regarded as the most typical representatives of the group as now generally accepted. These seem to be nearly related, through Bubaris, to the genus Microciona, and this relationship might appear to justify one in regarding the whole group as an offshoot of the Ectyoninæ in which both chelæ and acanthostyles have disappeared. I fear that no such simple view as this can be maintained and that the Axinellinæ are still of polyphyletic origin. In addition to those of ectyonine origin, some of them may be descended directly from esperelline ancestors, others from Haploscleridæ, but it seems impossible, in the present state of our knowledge, to sort them out. That they do not form an important, independent family, of the same rank as the Haploscleridæ or Desmacidonidæ, seems certain. In my Report on the Okhamandal Sponges [1916 A] I placed all the Axinelline species amongst the Haploscleridæ, but, in accordance with the views expressed in the earlier portions of the present memoir, it seems more probable that most of them, at any rate, are reduced Desmacidonidæ, as a sub-family of which I therefore propose to regard them. They may be divided conveniently into two sections—the Axinelleæ without acanthoxea and the Heteroxyeæ with them. Both these sections are well represented in the "Sealark" collection.

Since this Report was first completed I have seen the recent papers of Hallmann [1916, 1917 A, 1917 B] in which the author proposes a number of new genera of Axinellid sponges and a new classification of the group. It is impracticable to discuss these papers in the space and time now at my disposal, but I do not as yet see any reason for altering the views expressed in the present memoir.

Section AXINELLEÆ.

Without acanthoxea.

* For an interesting discussion of the characters of these genera *vide* Vosmaer [1912].

Genus Sigmaxinella Dendy [1897].

Axinelleæ with microscleres in the form of sigmata or trichodragmata (trichites) or both.

Hallmann [1916, 1917 A], in his recent revision of the genera of Axinellid sponges containing microscleres, has proposed to break up this genus. I am not, at present at any rate, prepared to adopt his views; on the contrary, I propose to enlarge my original conception of the genus Sigmaxinella by including in it species which contain trichodragmata only, without sigmata, as well as species which contain sigmata without trichodragmata.

92. *Sigmaxinella bihamigera* n. sp.

(Plate **16**, fig. 6 *a—c*.)

The single specimen, which is attached to a mass of calcareous débris, is massive, sessile, irregular; roughly in the form of a triangular pyramid, with broad base, and with apex unequally cleft, as if incipiently branching. Surface uneven, rough, and more or less strongly hispid in places, especially towards the apices. Vents rather small and inconspicuous, rather numerous, grouped on the apical portions of the sponge amongst the projecting spicules. Height of specimen 25 mm., breadth at base about the same. Texture rather hard and only slightly compressible, colour in spirit light yellowish brown.

The main skeleton consists of loose, sub-plumose columns of large styli, radiating towards the surface, where the apices of the terminal styli project more or less. The bases of the styli always appear to be directed inwards. There is no special dermal skeleton.

Megascleres:—Large, stout styli (Plate **16**, fig. 6 *a*), more or less curved or bent, especially towards the base. The spicule diminishes gradually in diameter towards the base, which is evenly rounded off, and more gradually towards the apex, which is moderately sharply and often more or less abruptly pointed. The full-grown spicule measures about 1·4 by 0·05 mm. A few very slender styli which occur appear to be young forms and are connected by intermediates with the stout ones.

Microscleres:—(1) Large sigmata (fig. 6 *b*), with short, sharply pointed, incurved ends, one of which is twisted out of the principal plane of the spicule, but not sufficiently to give to the spicule an **S**-shaped form as it lies on the slide. Length from bend to bend about 0·05 mm., thickness in the middle about 0·0027 mm.

(2) Small, slender, very slightly contort, **C**-shaped sigmata (fig. 6 *c*), length about 0·0164 mm.

The large sigmata, in particular, are extraordinarily abundant in the mesoglœa, which, in fact, is densely charged with them. Only a relatively small number of intermediates between the large and small forms occur.

This species appears to be quite distinct from any previously described. The typical axinellid form and arrangement of the megascleres induces me to place it in Sigmaxinella rather than in Desmacella, but the two genera are possibly nearly related.

Register Number, Locality, &c. XXIII., Providence, 4.10.05, D. 8, 125 fathoms.

93. *Sigmaxinella durissima* (Dendy).

Thrinacophora durissima Dendy [1905].

This species, of which only a single specimen was obtained by Professor Herdman in Ceylon, is represented in the "Sealark" collection by a considerable number of specimens from various localities. The arrangement of the skeleton and the form and size of the spicules are remarkably uniform throughout and agree closely with the corresponding features of the type specimen. As regards external form, however, the specimens may be grouped in three well-marked varieties, all of which differ more or less strikingly from the type, and which seem well worthy of being distinguished by separate varietal names.

The species has hitherto been placed in the genus Thrinacophora Ridley. The type of that genus, *R. funiformis* R. and D. [1887], however, is a much more specialized sponge, both as regards the arrangement of the skeleton, with its well-defined central axis, and its peculiar spiculation; and the mere presence of trichodragmata no longer appears to me to constitute sufficient justification for associating with it such species as *Sigmaxinella durissima*.

Previously known Distribution. Ceylon Seas (Dendy).

93 *a*. *Sigmaxinella durissima* (Dendy) var. *massalis* nov.

(Plate **5**, fig. 4, Plate **7**, fig. 4.)

Sponge (Plate **5**, fig. 4, Plate **7**, fig. 4) massive, rounded, or at least strongly convex above, irregular; either quite free or with a more or less extensive attachment to the substratum. Vents numerous, scattered, rather large (about 4 mm. in diameter), conspicuous, in some specimens slightly prominent, leading out of deep, wide oscular tubes. The largest specimen (R.N. LXXI. 1) is subglobose, but irregular, and no less than 80 mm. in maximum diameter. It appears to have lain quite freely on the sea-bottom and shows no indication at all of any attachment, while the vents are scattered at irregular intervals pretty well all over the surface, with which their margins are level. Another specimen (R.N. XVIII.) is cushion-shaped, strongly convex above and flattened below, with a large area of attachment. It has numerous large vents on the upper surface, with prominent margins. Another (R.N. XIX. 2) is turbinate, with greatly constricted base of attachment and numerous prominent vents on the upper surface.

This variety perhaps approaches most nearly to the type of the species, from which it differs in the large, conspicuous vents.

Register Numbers, Localities, &c. XVIII, XIX. 2, XX. 5, Providence, 4.10.05, 29—78 fathoms; LXXI. 1, Amirante, 17.10.05, E. 21, 30 fathoms.

93 *b*. *Sigmaxinella durissima* (Dendy) var. *erecta* nov.

(Plate **7**, fig. 5 *a*, *b*.)

Sponge (Plate **7**, fig. 5 *a*, *b*) vertically elongated, finger-like, unbranched (? always); attached to the substratum at the lower extremity; cylindrical or somewhat compressed, bluntly rounded at the apex. Vents small (about 2 mm. in diameter), shallow, without prominent margins; scattered all over the surface or with some tendency to form longi-

tudinal rows. The largest specimen (R.N. CXXX. 2 A) measures 120 mm. in height by 31 mm. in diameter, and tapers only slightly towards the apex.

Register Numbers, Localities, &c. VIII. 5, Saya de Malha, 6.9.05, C. 15, 55 fathoms; CXXXIII. 2 A, B, Seychelles, F. 9, 37 fathoms; CXXXVII. 1, Seychelles, 20.10.05, F. 4, 39 fathoms.

93 *c*. *Sigmaxinella durissima* (Dendy) var. *tethyoides* nov.

(Plate **7**, fig. 6 *a*, *b*.)

Sponge (Plate **7**, fig. 6 *a*, *b*) spherical or nearly so; attached by a more or less restricted area to fragments of nullipore. Surface thickly covered with small, low conuli separated by meandering grooves covered in by the pore-bearing dermal membrane. Vents numerous but rather inconspicuous, small (up to 3 mm. in diameter), shallow, without prominent margins, scattered irregularly all over the surface.

This very pretty and distinct variety bears a remarkable resemblance to a small species of Tethya, a resemblance which was probably augmented in life by a deep orange colour, which still remains to a large extent in the preserved specimens. (It is not absolutely certain, however, that this colour is natural.) There are six specimens in the collection, all from the same locality. The largest measures 24 mm. in maximum diameter and the smallest 16 mm.

Register Number, Locality, &c. VII. 2, Saya de Malha, 6.9.05, C. 15, 55 fathoms.

Genus AXINELLA Schmidt [1862].

Axinelleæ of varying habit, not flabellate, without microscleres. Skeleton consisting either of a central axis of spiculo-fibre from which brushes of spicules radiate to the surface or of parallel plumose columns of megascleres. Megascleres typically stylote.

It is more than likely that we shall ultimately have to restrict the scope of this genus in the manner indicated by Vosmaer [1912], but at present I make use of it in the wider sense which I have hitherto employed in order that I may be able to include therein certain species which I should otherwise not know where to place pending a much needed revision of the Axinelline genera.

94. *Axinella bubarinoides* n. sp.

(Plate **17**, fig. 1 *a*—*b*.)

There are half a dozen specimens of this interesting little sponge in the collection, all closely resembling one another in external characters, skeleton arrangement and spiculation. They are all low-growing and cushion-shaped, and several of them are still attached to fragments of nullipore, from which, however, they show a strong tendency to free themselves in the course of their growth. The shape of the specimens is irregular. The upper surface tends to be somewhat flattened and in some specimens is marked by narrow, convergent grooves. It also shows numerous minute round openings, scattered generally and in the grooves, which may represent vents. Otherwise it is even, not conulose. It may be slightly hispid in places. The largest specimen measures about 26 mm. in greatest breadth and 8 mm. in thickness in the middle. The colour in spirit is light brownish yellow. The texture is firm and compact, scarcely compressible, radially columnar.

The skeleton is composed of stout, close-set, plumose columns of bent styli. These columns branch as they approach the surface, but there appear to be no transverse connecting fibres. The component spicules have their bases felted together in the axis of the column and perhaps united by a little spongin, though the latter is not conspicuous. Their apices project obliquely outwards, and, at the ends of the columns, hispidate the surface. Between the columns a few much longer, isolated styli occur, arranged radially with their apices outwards.

Megascleres:—(1) Short, stout, smooth styli (Plate **17**, fig. 1 *a*); more or less bent at the base, and sometimes very strongly so, so as to resemble a hockey-stick; thickest towards the middle; base broadly rounded, apex gradually and sharply pointed. Size very variable, commonly about 0·48 by 0·034 mm.

(2) Long, slender, smooth styli (fig. 1 *b*); almost straight; tapering very gradually to the finely pointed apex, thickest near the base, which is broadly rounded. Size variable; a typical example measured 1·27 by 0·025 mm.; but both longer and shorter forms occur.

I have also seen a very small number of bent oxea. These appear to be merely abnormalities of the stout styli and are too few to be regarded as an essential element of the spiculation.

There are no microscleres.

This species is very interesting on account of its obvious relationship to species of the genus Bubaris, from which it differs in the absence of the basal layer of diactinal megascleres.

The form of the stout styli often resembles that of the "rhabdostyle" of Rhabderemia.

A very curious phenomenon of resorbtion is sometimes to be observed in the case of these spicules. In R.N. CXXII. 1A all degrees of resorption of the silica may be seen, until finally nothing remains but an empty mould formed by the spicule sheath. The solution of the silica appears to take place from the axial canal and the outer surface simultaneously, so that, before finally disappearing, the spicule is reduced to a thin-walled tube.

Register Numbers, Locality, &c. R.N. CXXII. 1A—F, Salomon A, 3.7.05, 75 fathoms

95. *Axinella spiculifera* (Lamarck).

(Plate **8**, fig. 7.)

Spongia spiculifera Lamarck [1813]. *Axinella spiculifera* Ridley [1884 c].

There are two good specimens of this little-known species in the collection. As they agree very closely with Ridley's description and come from the same locality, I do not think there can be any doubt as to their specific identity with his specimen, and as he was able personally to examine a Lamarckian specimen, his identification with the latter is probably also correct.

The larger of the two "Sealark" specimens (Plate **8**, fig. 7) consists of three short, thick branches arising from a common base, but two of them are fused together laterally for almost their entire length to form a flattened lobe, bifid at the top. The surface is strongly conulose and honeycombed by round openings between the conuli, exactly as described by Ridley. The total height is about 60 mm. and the individual branches are about 16 mm. thick and broadly rounded at the apex. The colour in spirit is pale brownish yellow,

perhaps slightly stained by other specimens. The second specimen is closely similar but consists of only a single finger-shaped process, arising from a spreading base which encrusts a nullipore. It is rather paler in colour.

The skeleton is a fairly close and not very well defined reticulation of spicular fibre, containing a considerable amount of very inconspicuous spongin. The primary lines are plurispicular and scarcely plumose; they are connected by often unispicular secondaries. The spicules are more or less curved, smooth styli, broadly rounded at the base and gradually sharp-pointed at the apex. They measure, in R.N. XCII. 3, about 0·3 by 0·0123 mm., being decidedly more slender than in Ridley's and Lamarck's specimens. In R.N. CV. 2, however, they may be rather stouter than in R.N. XCII. 3. In both specimens the mesoglœa contains an immense number of rounded granular cells, probably pigment cells, about 0·016 mm. in diameter, now of a pale yellowish colour.

Previously known Distribution. King Island, Australia (Lamarck); Amirantes (Ridley).

Register Numbers, Localities, &c. XCII. 3, CV. 2, Amirante, E. 2 and E. 6, 9.10.05, 28 and 29 fathoms.

Genus PHAKELLIA Bowerbank [1864].

Axinelleæ of compressed, flabellate (or cup-like) form. Without microscleres.

As in the case of Axinella I retain this genus in the wide sense in which I have hitherto employed it, merely as a provisional measure.

96. *Phakellia donnani* (Bowerbank).

Isodictya donnani Bowerbank [1873 B].
Axinella donnani Dendy [1887, 1889].
Phakellia donnani Dendy [1905, 1916 A].
Phakellia donnani Row [1911].

This common Ceylon species is represented in the collection by three cup-shaped specimens with short stalks and more or less folded walls, altogether very typical as regards external form. Two have been dried and one is in spirit and all are rather dark brown in colour. The spiculation is not quite so typical, for the styli are considerably larger than is usual in Ceylon and Indian specimens, commonly measuring about 0·48 by 0·026 mm., though numerous much more slender forms may also occur.

Previously known Distribution. Gulf of Manaar, Ceylon Seas (Bowerbank, Dendy); Okhamandal (Dendy); Red Sea (Row).

Register Numbers, Localities, &c. XXXII., Cargados Carajos, 30.8.05, B. 17, 30 fathoms; CXLII., CXLIII., Cargados Carajos, 30—35 fathoms.

97. *Phakellia conulosa* n. sp.

(Plate **6**, fig. 4, Plate **17**, fig. 2 *a*, *b*.)

The single specimen (Plate **6**, fig. 4) is a proliferously lamellar sponge, greatly constricted towards the base of attachment so as to form a very short, thick stalk. The principal lamella gives off secondary lamellæ almost at right angles. The lamellæ are only about 3 mm. thick and have a narrow, slightly sinuous margin. Both surfaces of the lamellæ are thickly beset with small conuli, which often unite in longitudinal ridges running towards the margin. The apices of the conuli are often slightly hispid with projecting spicules.

Between the conuli, where the surface is uninjured, stretches a thin, glabrous dermal membrane. To the naked eye the two surfaces of the lamella appear similar but under a lens the dermal membrane appears, at any rate in places, to be minutely reticulate only or chiefly on the one surface. This is probably the inhalant surface. The other surface bears a few minute, scattered apertures which may represent vents; they are, however, very inconspicuous and seem to be not altogether wanting on the inhalant surface also. Indeed I am not quite sure whether the two surfaces are distinguishable from one another. When the specimen is examined against the light a few small perforations can be seen running at right angles through the thickness of the lamina and blocked at one end (or possibly both) by the dermal membrane. The colour in spirit is light brown, with a pinkish tinge in places*. The texture is tough, flexible, resilient. The total height of the specimen is 115 mm., the greatest breadth 119 mm.

The skeleton is very lax and irregular, consisting of loose tracts or bundles of styli held together by a large quantity of very pale-coloured spongin, almost invisible in Canada balsam. There is very little condensation in the middle of the lamella. The spicule-tracts run upwards and outwards into the surface conuli and numerous irregularly scattered spicules lie between them.

Spicules:—Smooth styli, of two chief kinds but not by any means sharply distinguished from one another.

(1) Stout and comparatively short (Plate **17**, fig. 2 *a*), often a good deal bent; typical size about 0·69 by 0·03 mm.

(2) Long and comparatively slender (fig. 2 *b*); typical size about 1·5 by 0·02 mm.; sometimes a good deal more slender. Both kinds are broadly and evenly rounded off at the base and more or less gradually and sharply pointed at the apex. The shorter ones are the more numerous but the others are also plentiful.

This is a very beautiful species, characterized chiefly by its strongly conulose surface, which causes it to resemble somewhat an Acanthella. It has not, however, the characteristic cartilaginous texture of that genus.

Register Number, Locality, &c. XLII. 13, Cargados Carajos, 30.8.05, B. 9, 30 fathoms.

97 *a*. *Phakellia conulosa* var. *mauritiana* nov.

(Plate **6**, figs. 5, 5 *a*.)

The single specimen (Plate **6**, figs. 5, 5 *a*) is stipitate, flabellate, with an irregularly undulating margin and without proliferations. The lamina is supported on four distinct, short stalks, joined together below in the basal attachment plate. The inhalant and exhalant surfaces of the lamina are sharply differentiated from one another. The former is covered with close-set, small conuli, which tend to unite in longitudinal ridges, running towards the margin. The apices of the conuli are often slightly hispid with projecting spicules. Between the conuli is stretched a thin, minutely reticulate, pore-bearing dermal membrane (rubbed off in places). The exhalant surface is more coarsely rugose, with a network of low, rounded ridges. A thin dermal membrane partially covers the depressions between these ridges, but is pierced by numerous circular apertures about 1·5 mm. in

* Possibly stained by other sponges in the same jar.

diameter, around which the thin edge of the dermal membrane appears like a sphincter. These apertures lead into cylindrical canals which run more or less at right angles through the lamina, being closed at the other end by the pore-bearing dermal membrane. The canals may also be closed on the exhalant surface by an imperforate dermal membrane, so that they may be either closed at both ends or closed at one end and open at the other. Two or more canals often open on the exhalant surface by a common aperture. These features can readily be observed when the specimen is examined against the light by means of a pocket-lens. The raised portions of the exhalant surface are finely granular and minutely and sparsely hispid, and contain a good many imbedded sand-grains.

The maximum height of the specimen is 113 mm., the greatest breadth 132 mm., the thickness of the lamina about 5 mm., the length of the separate stalks about 17 mm. The colour in spirit is dark chocolate brown, but histological examination of thin sections shows that this is almost certainly largely artificial. It is probably chiefly due to staining by a specimen of *Plocamia massalis* obtained at the same time and perhaps originally in the same jar. Texture rather rigid, but flexible, resilient and fairly tough.

The skeleton is an irregular and lax reticulation of ill-defined spicular fibre and separate spicules, held together by an abundance of spongin. There is a slightly developed condensation in the middle of the lamella, from which primary fibres run outwards into the conuli on both surfaces. These are connected by secondary fibres running more or less at right angles to them, but the whole arrangement is extremely irregular.

Spicules:—Smooth styli of two principal kinds but by no means sharply differentiated from one another.

(1) Comparatively short and stout; more or less curved or crooked, broadly rounded at the base, fairly gradually and sharply pointed at the apex; commonly measuring about 0·65 by 0·034 mm.

(2) Long and slender; may be slightly curved; broadly rounded at the base, gradually and finely pointed at the apex; size about 1·4 by 0·017 mm. These are very scarce.

As the specimen is well preserved it seems desirable to add some particulars as to the canal-system and histology, which are of considerable interest. Vosmaer [1885 B], in describing his *Phakellia bowerbanki*, gives a diagram showing the principal canals running right through from surface to surface of the frond. In the Report on the "Challenger" Monaxonida I myself figured the canal-system of *Phakellia ventilabrum* var. *connexiva*. In this case I thought I could distinguish between inhalant and exhalant principal canals, interdigitating with one another and neither running right through the frond. I am convinced now, from re-examination of my original sections and from comparison of *P. conulosa* var. *mauritiana*, that I was wrong, and that the main canals run right through from side to side as Vosmaer described. Vosmaer was unable to find the flagellate chambers in his sponge and suggested that as the water can flow through and through the body the natural movements of the water would probably suffice for the requirements of the sponge. I had, however, no difficulty in finding the flagellate chambers in *P. ventilabrum* var. *connexiva*, and the same is true of *P. conulosa* var. *mauritiana*, in which they are subspherical, about 0·029 mm. in diameter, and almost certainly eurypylous. It seems a very extraordinary thing that the pore-sieves should lead directly into what appear to be the exhalant canals,

so that water can pass right through the sponge without passing through the flagellate chambers, but it is probable that the principal canals should be regarded simply as perforations of the lamella, enclosed in the process of growth, and that the pore-sieves which cover them in at one end are not ordinary inhalant openings. The latter are probably to be found either on the surface of the sponge between the groups of pores which lead into the main canals, or in the walls of these canals themselves. It is easy to see that numerous smaller exhalant canals open into the main canals.

The dermal membrane of the inhalant surface in this variety exhibits a minutely reticulate character quite apart from that caused by the presence of the pores, and on a larger scale. This is due to the presence of a network of fibrillar bands, separating the small, rounded or oval pore-areas from one another.

This variety is no doubt closely related to the typical *Phakellia conulosa*, being distinguished chiefly by the much more obvious differentiation between the two surfaces of the lamella and the much better developed principal canals, with their distinct exhalant openings at one end and pore-sieves at the other.

Register Number, Locality, &c. CXXVI. 1, Mauritius, 23.8.05, A. 2, 100 fathoms.

Genus ACANTHELLA Schmidt [1862].

Axinelleæ of usually flabellate form and more or less cartilaginous consistence. With more or less strongly aculeate or conulose surface. Without microscleres.

98. *Acanthella carteri* Dendy.

(Plate **5**, fig. 5.)

Acanthella carteri Dendy [1889, 1905].
Acanthella aurantiaca Keller [1889].
Acanthella aurantiaca Topsent [1906 B].
Acanthella aurantiaca Row [1911].

This common Indian Ocean species is represented in the collection by several specimens, some of which are very fine examples. In my Report on the Ceylon Sponges [1905] I suggested that Keller's *Acanthella aurantiaca* might be identical with *A. carteri*; this view I may now definitely adopt. Keller's description was published in the same year as my own, but some months later.

One of the specimens (LXVI.), when received, still retained its characteristic deep orange colour, and the alcohol in which it was preserved was also coloured orange. Fortunately it was in a jar by itself.

R.N. CXXXIII. 1 (Plate **5**, fig. 5) was preserved in formalin and illustrates very well the effect of this preservative, being reduced practically to a mere skeleton. Its appearance has been thereby so altered that I at first quite failed to recognize it as belonging to this species. Keller (1889) has given an excellent coloured figure of the external form of the sponge, apparently taken from life.

Previously known Distribution. Gulf of Manaar (Dendy); Red Sea (Keller, Row, Topsent).

Register Numbers, Localities, &c. XLII. 9, XLIII. 6, Cargados Carajos, 30.8.05, B. 9 and 13, 30 fathoms; LXVI., LXIX. 1, Diego Garcia, 14 fathoms; XCV., Amirante, 18.10.05, E. 25, 20—44 fathoms; CXX. 1, Salomon, 10—14 fathoms; CXXXIII. 1, Seychelles, F. 9, 37 fathoms.

99. *Acanthella pulcherrima* Ridley and Dendy var. *calyx* nov.

(Plate **5**, fig. 6.)

Acanthella pulcherrima Ridley and Dendy [1886, 1887].

The typical form of this sponge, from Torres Straits, figured in the Report on the "Challenger" Monaxonida, is remarkable for its beauty, but the variety obtained by the "Sealark" Expedition at Cargados Carajos is still more elegant, having the form of a stalked goblet attached to a piece of dead coral (Plate **5**, fig. 6). The total height of the specimen is about 85 mm., and the maximum breadth of the cup about 63 mm. The cup is deep and funnel-shaped and rather thin-walled. The stalk is about 13 mm. in length and 5 mm. in diameter. The inner and outer surfaces of the cup are similar, beset with close-set longitudinal ridges, more or less broken up into small spines or conuli, much as in the type of the species. Neither pores nor vents are recognizable, both being probably covered over by the dermal membrane, which is presumably provided with pore-sieves in life. The colour in spirit is light brown.

The skeleton arrangement and spiculation closely resemble those of the type. The slender strongyla—sinuous in boiled-out preparations—seem to be a good deal longer, sometimes measuring at least 1·3 by 0·0086 mm., but very variable. The styli (sometimes becoming oxeote) are also perhaps a little larger.

Previously known Distribution of the Species. Torres Straits (Ridley and Dendy).

Register Number, Locality, &c. LXXVIII. 9, Cargados Carajos, 28.3.05, B. 2, 30 fathoms.

100. *Acanthella cavernosa* n. sp.

(Plate **7**, fig. 7 ; Plate **17**, fig. 3 *a*—*b*.)

The single specimen (Plate **7**, fig. 7) is massively lobose, swollen, with a contracted base of attachment, almost forming a short, thick stalk. The surface is covered with coarse aculeations, mostly blunted, between which is stretched the glabrous, parchment-like dermal membrane, interrupted here and there by large pseudoscula, which lead into the very cavernous interior of the sponge. The total height is 65 mm., the maximum diameter 45 mm. Texture compressible, resilient. Colour in spirit, yellowish grey, with a pinkish tinge in places.

The skeleton as a whole is tree-like, with the branches terminating in the surface conuli. Each branch may be regarded as a very stout fibre, about 1·0 mm. in diameter, composed of a very dense feltwork of slender spicules, many of which echinate its surface. If there is any spongin at all in these fibres it is very inconspicuous. The fibres are rather distant from one another and between them the mesoglœa is free from spicules. There is of course no dermal skeleton and only on the conuli is there sometimes a slight indication of hispidation.

Spicules:—(1) Slender styli (Plate **17**, fig. 3 *a*), nearly straight or more or less crooked; varying greatly in length up to about 0·88 mm. and in diameter up to about 0·011 mm.; base evenly rounded off, apex usually gradually and sharply pointed, often irregular.

(2) Slender strongyla (fig. 3 *b*), usually longer than the styli and sinuous in boiled out preparations; length up to about 1·3 mm., diameter up to about 0·011 mm.

As regards external form this species seems to come nearest to the type specimen of Carter's *Acanthella stipitata* [1881 c], which seems to be the common species on the South coast of Australia. In that species, however, the strongyla, so abundant in *A. cavernosa*, are either absent or feebly developed. As regards spiculation the "Sealark" sponge makes a nearer approach to the Japanese species described [1898] by Thiele (*A. vulgata* and others which are probably identical); but the external form is very different. A supposed variety of *A. stipitata* from Torres Straits, described in the Report on the "Challenger" Monaxonida, may be specifically identical with *A. cavernosa* but has shorter spicules. From the common Indian Ocean species, *A. carteri*, *A. cavernosa* is distinguished both by external form and by the presence of the numerous long, slender strongyla. The species of Acanthella are, however, extremely difficult to discriminate, and there is no doubt that far too many have already been proposed, so that it is with considerable reluctance that I suggest a new one.

Register Number, Locality, &c. LXXI. 7, Amirante, 17.10.05, E. 21, 30 fathoms.

Genus Auletta Schmidt [1870].

Axinelleæ of tubular form, with vents at the apices of the branches. Skeleton composed of megascleres (stylote, strongylote or oxeote) arranged chiefly in longitudinal bands and radiating towards the surface in tufts. No microscleres.

101. *Auletta elongata* Dendy.

Auletta elongata Dendy [1905]. *Auletta elongata* var. *fruticosa* Dendy [1916 A].

This species is represented in the collection by three specimens, two from Amirante and one from Cargados Carajos. They all differ from the type of the species in their shorter branches (tubes) and more bushy habit; R.N. c., in particular, closely resembling the figure of *Auletta elongata* var. *fruticosa* given in my Okhamandal Report [1916 A]. The average length of the spicules, however, appears to be much greater than in that variety and in R.N. XXIX. 1 the strongyla may attain a length of 2·67 mm. These long strongyla, more or less sinuous in boiled out preparations, appear to be very characteristic of the species.

Previously known Distribution of Species. Ceylon, Gulf of Manaar, Okhamandal (Dendy).

Register Numbers, Localities, &c. XXIX. 1, Cargados Carajos, 3.10.05, B. 24, 30 fathoms; c., Amirante, 11.10.05, E. 10, 22—85 fathoms; CII. 1, Amirante, 18.10.05, E. 25, 44—20 fathoms.

102. *Auletta lyrata* (Esper) var. *brevispiculata* Dendy [1905].

A fragment of an Auletta from Cargados Carajos is almost certainly referable to this variety. It consists of portions of two very thick-walled tubes fused together laterally for almost their entire length. In one the free end remains perfect and shows a saucer-shaped terminal depression with a sphinctrate vent. The surface is slightly rugose, with a finely reticulate dermal membrane between the rugosities, and very slightly hispid in places.

The skeleton is much more typically "Axinellid" than usual in the genus, consisting chiefly of distinctly plumose columns of short spicules curving outwards to the surface but connected by spicule bundles and single spicules crossing at right angles between adjacent columns. A good deal of very pale-coloured and inconspicuous spongin is present around the spicules, at any rate in places. Many spicules are irregularly scattered between the columns. The spicules are all rather short, usually stout, more or less bent styli and oxea, measuring about 0·34 by 0·017 mm. when fully grown.

It may be necessary, when we know more about the range of variation, to raise this variety to specific rank.

Previously known Distribution of the Variety. Gulf of Manaar (Dendy).

Register Number, Locality, &c. XXXV., Cargados Carajos, 30.8.05, B. 13, 30 fathoms.

Genus Hymeniacidon Bowerbank [1864].

Axinelleæ in which the skeleton is a reticulation of spicular fibre or a feltwork of loose spicules, with or without spongin. Without a special dermal crust of tangential spicules. Megascleres stylote to tylostylote (? sometimes oxeote). No microscleres.

This is a very unsatisfactory genus, however it may be diagnosed. It is evidently composed of species with a much reduced spiculation, possibly derived in part from an Ectyonine line of ancestry through some such form as *Hymedesmia lipochela*, in which the spiculation is already reduced to smooth subtylostyli and tylostyli. It is, indeed, very probable that it is not a natural genus at all but a polyphyletic group derived from various sources.

103. *Hymeniacidon variospiculata* n. sp.

(Plate **17**, fig. 4.)

The single specimen appears to be part of an encrusting sponge which has been cut off from its base of attachment. Its present thickness is not more than 3 or 4 mm. except where it rises up in a low projection bearing a single relatively large vent, 3 mm. in diameter, which forms the termination of a deep, cylindrical, oscular tube. The margin of the vent is destitute of any membranous extension. The surface, except immediately around the vent, exhibits a very characteristic meandriniform pattern, due to the presence of a network of strongly developed subdermal cavities, covered over with a very thin, transparent dermal membrane which is reduced to a sieve by the very numerous inhalant pores. The specimen measures about 21 mm. by 13 mm. in length and breadth. The texture is firm but somewhat cavernous internally. The colour in spirit is light brown.

The main skeleton is a dense and thoroughly confused feltwork of single spicules of very various sizes. In the interior of the sponge they appear to be completely without definite orientation, but in the solid trabeculæ which separate the subdermal cavities they mostly lie more or less at right angles to the surface and often with their apices projecting slightly beyond it. There also appear to be more of the smallest spicules in those situations than elsewhere, and these may even show a tendency to arrange themselves in very feebly developed dermal brushes. Another noteworthy feature is the presence of a large quantity of sand in the tissues between and immediately beneath the subdermal cavities.

There is no dermal skeleton.

Spicules (Plate **17**, fig. 4). Smooth styli and subtylostyli (or tylostyli) of various shapes and sizes, connected by intermediates. The following may be taken as typical: (*a*) Long, stout, more or less bent or crooked; evenly rounded off or slightly enlarged at the base, which is a little narrower than the middle; tapering very gradually to the apex, which is usually sharply pointed but may be more or less blunted. Size about 0·9 by 0·039 mm. (*b*) Similar to the above and of about the same length, but only about 0·017 mm. in diameter, or even less. (*c*) Short and slender, with well-developed, rounded head and gradually and sharply pointed apex; slightly curved; size about 0·2 by 0·0086 mm., or even less sometimes. Some of the larger spicules, at any rate, instead of being simply tylote, have a slight annular thickening situate at a varying distance from the basal end.

Register Number, Locality, &c. CXXII. 7, Salomon A, 3.7.05, 75 fathoms.

104. *Hymeniacidon conglomerata* n. sp.

(Plate **8**, fig. 8; Plate **17**, fig. 5 *a*—*b*.)

There are two specimens of this sponge in the collection, which are very likely parts of the same colony. Each consists of an agglomeration of rather slender, frequently anastomosing branches, terminating here and there in short, free apices (Plate **8**, fig. 8). The branches are about 3 mm. in diameter and are attached here and there to fragments of calcareous débris. Their surface is marked by a feebly developed reticulation of low ridges and conuli and is slightly hispid. The vents appear to be small and scattered. The colour in spirit is light brown. The texture is compressible and resilient, fairly tough.

The skeleton is a confused reticulation of spicules, some of which are united together in fibres by a large amount of pale-coloured spongin. The principal fibres run lengthwise and the arrangement of the spicules in them is very lax. Individual spicules and loose bundles of spicules radiate obliquely outwards to the surface, especially to the conuli, beyond which their apices frequently project. The radiating bundles may have a slightly plumose character. There is no special dermal skeleton but the thin, transparent dermal membrane is stretched between the conuli.

The spicules are long, smooth styli (Plate **17**, fig. 5 *a*), all rather slender but varying considerably in shape and dimensions. They are more or less curved or crooked, evenly rounded off at the base, usually more or less gradually sharp-pointed but often irregular and sometimes blunted at the apex. They measure up to about 0·9 by 0·022 mm. but are usually more slender; sometimes very slender (perhaps young). A few tylostyli (fig. 5 *b*), with rounded heads, also occur; these do not appear to attain so great a length as the styli. There are also a few strongyla.

The dermal membrane of this sponge and, to a less extent, the deeper tissues, contain a variable number of curious spherical bodies, commonly about 0·028 mm. in diameter. These have a radially striated structure towards the periphery while the middle is usually occupied by a large number of minute dark granules that look like pigment-granules. I am pretty sure, however, that these bodies are artificial concretions and not pigment cells.

Register Numbers, Locality, &c. LXXVIII. 12, 16, Cargados Carajos, 28.3.05, B. 2, 30 fathoms.

Genus Leucophlœus Carter [1883 f].

Axinelleæ of massive habit, often clathrous. Main skeleton a reticulation or feltwork of loose spicules or spicular fibre with little or no spongin. Dermal skeleton well developed, usually as a crust of tangentially placed spicules. Megascleres typically stylote, sometimes oxeote. No microscleres.

105. *Leucophlœus fenestratus* Ridley.

Leucophlœus fenestratus Ridley [1884 c]. *Hymeniacidon fenestratus* Lindgren [1898].

The specimen is a good deal damaged, but in its highly cavernous character, with numerous wide cavities separated by thin partitions, it evidently agrees closely with the type, as described by Ridley. The general form is massive, with very uneven, much folded, but almost glabrous surface. It measures about 83 mm. in length, with an average breadth of about 35 mm. The texture is rather friable, the colour in spirit pale yellowish grey.

The main skeleton is a dense, confused feltwork of fairly large and stout styli, with a tendency to arrange themselves in ill-defined bundles. The dermal skeleton consists, in places at any rate, of a dense feltwork of smaller styli, or subtylostyli, arranged tangentially.

The larger styli are usually more or less crooked and are characterized by the often very conspicuous narrowing of the base; they measure up to 0·8 by 0·026 mm. The smaller subtylostyli vary greatly in size, say about 0·25 by 0·007 mm., but they are connected with the larger forms by innumerable gradations. These smaller forms are not mentioned by Ridley in his original description but we pointed out in the Report on the "Challenger" Monaxonida (p. 169) that small surface spicules do occur in this species.

In *L. subaceratus* Ridley and Dendy [1887], which is evidently very closely related to *L. fenestratus*, there appears to be a much sharper distinction between the larger styli of the main skeleton and the small surface spicules, and the latter are characteristically arranged at right angles to the surface, but very sparsely. I suspect that there is much variation in this respect, however.

Previously known Distribution. Port Darwin (Australia), Arafura Sea, Providence (Mascarenes) (Ridley); Coast of Cochin China (Lindgren).

Register Number, Locality, &c. viii. 4, Saya de Malha, 6.9.05, c. 15, 55 fathoms.

Genus Spongosorites Topsent [1896 a].

Axinelleæ in which the main skeleton is a dense, confused feltwork of oxea of very various sizes; some of the smaller oxea, arranged tangentially, usually form a dermal skeleton. No microscleres.

This genus was originally proposed by Topsent in 1896 for his *Spongosorites placenta* and placed in the family "Coppatiidæ." Two years later [1898 c] the same author proposed the genus Anisoxya, also characterized by the absence of microscleres and the presence of oxea of very various sizes, but supposed to differ from Spongosorites in the nature of the ectosome, the structure of the choanosome, &c. This genus has also been placed by its author [1904 a] in the "Coppatiidæ" but the name Anisoxya, being pre-occupied, has been replaced by Topsentia [Berg 1899].

As there does not seem, in the present state of our knowledge, to be any really tangible distinction between Spongosorites and Topsentia I propose to make use of the former name, as I did in my report on the Ceylon Sponges, although the latter has been adopted by Hentschel [1912] for a species closely related to that about to be described. Hentschel, indeed, adopts both genera, placing Spongosorites in the Axinellidæ and Topsentia in the Coppatiidæ. It is quite possible that there may really be two phylogenetically distinct generic types, represented by such forms as *Spongosorites placenta* and *Topsentia glabra* respectively, which have come to resemble one another by convergence, but this point can only be decided by minute anatomical investigations such as have not yet been carried out.

In the meantime the resemblance which these sponges bear to species of Hymeniacidon and Leucophlœus makes it advisable to keep them all close together as reduced Sigmatotetraxonida. It is true that in Hymeniacidon and Leucophlœus the typical megascleres are stylote, while in Spongosorites they are oxeote, but these two types of spicule appear to merge into one another in many so-called Axinellidæ.

On the other hand it must be borne in mind that Spongosorites may have affinities with the genus Petrosia, with which it would seem to be connected by such species as *P. seychellensis* (q.v.).

106. *Spongosorites salomonensis* n. sp.

(Plate **17**, figs. 6 *a*—*c*.)

This species is represented by two or three irregular, massive, almost tuberous pieces, all in the same jar and very possibly parts of the same colony. The largest piece measures about 58 mm. in maximum diameter. The surface, which is fairly smooth but very uneven, has been a good deal worn, but in some places, at any rate, where it remains uninjured, there is a thick dermal membrane firmly adherent to the underlying tissues. The vents appear to be rather small round openings in the dermal membrane, varying in size, without prominent margins. Rather narrow cylindrical canals penetrate the interior of the sponge; otherwise it is solid and compact. Texture rigid and incompressible. The colour in spirit is dark brown, and, as there were no other specimens in the jar, this may be regarded as proper to the sponge.

The main skeleton is a very dense and entirely confused feltwork of megascleres of various sizes, large and small mixed together without any sort of order. For some distance beneath the (uninjured) surface, however, the smaller ones predominate, while in the dermal membrane itself the skeleton is composed almost exclusively of the smaller forms, interwoven to form a very compact feltwork in which most of the spicules lie tangentially.

Spicules:—(1) Large, stout megascleres (Plate **17**, fig. 6 *a*); slightly curved, fusiform; ends very variable, sharp or blunt, so that the spicule may be oxeote, strongylote or stylote. Size about 1·2 by 0·043 mm.

(2) Small oxea (fig. 6 *c*); slightly curved, fusiform, gradually and sharply pointed at each end. Size very variable, commonly about 0·37 by 0·012 mm., but ranging down to 0·065 by 0·0034 mm. on the one hand, and, on the other, connected by intermediates (fig. 6 *b*) with the large, stout oxea.

This species is evidently nearly related to my *Spongosorites* (?) *lapidiformis* from Ceylon [1905] and Hentschel's *Topsentia indica* from the Arafura Sea [1912]. It appears to differ from both in its dark colour, in the presence of a well-developed dermal membrane with special skeleton, and in the greater length attained by the large oxea.

Register Number, Locality, &c. CXVI., Salomon B, 60—120 fathoms, 3.7.05.

Section Heteroxyeæ.

Axinellinæ with symmetrical acanthoxea which do not appear to be derived from echinating acanthostyles. Other spicules various.

Genus Higginsia Higgin [1877].

Heteroxyeæ of various habit. Megascleres smooth oxea (sometimes styli) and acanthoxea. No microscleres (unless the acanthoxea can be regarded as such).

107. *Higginsia petrosioides* n. sp.

(Plate **7**, fig. 9; Plate **17**, fig. 7 *a—e*.)

The single specimen (Plate **7**, fig. 9) is cushion-shaped, with a constricted base of attachment and broadly rounded margins. The upper surface is strongly convex, rising gradually to a blunt apex in the centre, occupied by two or three rather small, inconspicuous vents. The upper surface is also thickly and uniformly beset with small conuli, caused by the slightly projecting ends of the stout radially arranged skeleton-columns. The specimen measures 38 mm. in greatest diameter and 25 mm. in maximum thickness, in the centre. The texture is very hard and compact; the colour, in spirit, light, dull yellow.

The main skeleton is very dense and consists principally of stout, radially arranged columns of stout megascleres (chiefly oxeote). In the columns the spicules are not very regularly arranged but for the most part run lengthwise. The narrow intervals between the columns are bridged by similar spicules which often run more or less at right angles to them, either singly or grouped; but the whole arrangement of the skeleton tends to become confused and irregular. Small spined oxea are abundantly scattered everywhere between the other spicules and in the thin dermal membrane which is stretched between the slightly projecting ends of the skeletal columns.

Spicules:—(1) Stout, smooth, fusiform oxea (Plate **17**, fig. 7 *a*); fairly strongly curved; usually gradually and sharply pointed at each end, only very occasionally passing into stylote or strongylote forms (figs. 7 *b, c*); size about 0·74 by 0·043 mm.

(2) Smooth, slender megascleres (fig. 7 *d—d''*); usually more or less crooked; sometimes gradually and simply sharp-pointed at each end, sometimes hastate, and sometimes having each end divided into two sharp teeth, with a slight enlargement of the shaft and a distinct enlargement of the axial canal at the point of bifurcation; size about 0·55 by 0·0086 mm. These spicules occur in comparatively small numbers, quite irregularly scattered through the sponge.

(3) Small spined oxea (acanthoxea) (fig. 7 *e*); sharply pointed at each end; fairly stout;

usually curved or even angulated in the middle; uniformly and fairly closely beset with small sharp spines; size about 0·16 by 0·008 mm. (excluding spines). In a boiled-out preparation I have seen a very few smooth oxea of about the same size and shape, and there are a number of smaller spined forms which may be young.

This species appears to be quite distinct from any previously described. Its most interesting feature is the possession of slender megascleres whose ends are frequently bidentate. It will be remembered that this character occurs at one end only of a similar spicule (described as a stylus) in *Dendropsis bidentifera* Ridley and Dendy [1887], and its occurrence in *Higginsia petrosioides* certainly seems to afford support to the views of those authors who regard Dendropsis as a synonym of Higginsia.

Register Number, Locality, &c. CXXXII. 2, Seychelles, 20.10.05, F. 6, 44 fathoms.

108. *Higginsia higgini* n. sp.

(Plate **7**, fig. 8; Plate **17**, fig. 8 *a—f*.)

Higginsia sp. Dendy [1915].

Sponge (Plate **7**, fig. 8), massive, irregular, or encrusting; with a more or less strongly pronounced tendency to grow out into ascending digitiform processes, which are usually compressed laterally. Surface uneven, slightly conulose, in places hispid (especially on the conuli). Texture fairly compact but compressible and resilient; slightly fibrous; rather friable. Vents not seen. The largest specimen (R.N. LXV.), which is broken in half and otherwise a good deal damaged, measures about 98 mm. in height, 60 mm. in breadth, and 70 mm. in thickness at the base. It is somewhat wedge-shaped, narrowing off to a ridge at the top, from which the feebly developed digitiform processes arise. Another, much smaller, specimen (R.N. LXIX. 2) is very irregular in shape but has the digitiform processes much better developed. The colour, in spirit, ranges from brown to light yellowish grey.

The main skeleton is very lax and irregular, composed chiefly of very loose, ill-defined wisps of long, stout oxea, which run towards the surface, from which they may project in loose radiate tufts of usually more slender spicules The oxea are accompanied by very long, slender styli, which seem to have no definite arrangement. Numerous spined microxea are scattered in the thin dermal membrane and in the choanosome.

Spicules:—(1) Fairly stout, smooth oxea (Plate **17**, fig. 8 *a*); gently curved or slightly angulate in the middle; gradually and sharply pointed at each end; occasionally becoming stylote; size about 1·3 by 0·026 mm. Numerous more slender forms of about the same length also occur.

(2) Very long, slender, smooth styli (fig. 8 *b*); usually slightly curved; evenly rounded off at the base, which is the thickest part of the spicule; gradually sharp-pointed at the apex; size about 2·76 by 0·017 mm. Occasionally a short slender style is also seen (fig. 8 *c*).

(3) Spined oxea (acanthoxea) (fig. 8 *d*); rather slender; slightly angulate in the middle; covered pretty uniformly with small, sharp spines, but often with a specially strongly developed whorl of spines at or near the middle; gradually and sharply pointed at each end; very occasionally smooth and sub-centrotylote (fig. 8 *f*); sometimes intermediate (fig. 8 *e*); size about 0·164 by 0·004 mm. (exclusive of spines).

This species is chiefly distinguished by its long, fairly stout, smooth oxea and very long, slender styli; also, perhaps, by the frequently sub-centrotylote character of the acanthoxea, indicated usually by specially strong spination near the centre, but most distinctly in the rare cases where the spicule is smooth.

The imperfect specimen which I recently recorded from Okhamandal is evidently a slight variety of this species, in which the acanthoxea are usually more strongly angulate, and the smooth sub-centrotylote form is much more abundant.

Previously known Distribution. Okhamandal (Dendy).

Register Numbers, Localities, &c. XXI. 6, 7, 10, Providence, 3.10.05, D. 1, 39 fathoms; LXV., Lagoon, Diego, 12.7.05, 10 fathoms; LXIX. 2, Diego Garcia, 14 fathoms; CXIII. 7, Egmont Reef.

Genus Halicnemia Bowerbank [1864].

Heteroxyeæ in which the sponge typically forms a thin crust. The principal megascleres are long, stout tylostyli or styli arranged at right angles to the base of support. Microscleres are present in the form of spined microxea (which may be replaced by pseudasters?). There may also be long, slender, centrotylote oxea.

Topsent has published a very useful and interesting paper [1897 B] on this rare and little known genus, in which he points out its close relationship to Higginsia. He includes in the genus one species, *H. constellata*, in which the spined microxea are replaced by "oxyasters", from which he draws the conclusion that the microxea are aster-derivatives. More probably the "oxyasters" are merely pseudasters derived from the spined microxea.

The "Sealark" collection contains a single specimen, evidently referable to an undescribed species, distinguished chiefly by the absence of the long, slender, centrotylote oxea (tornota of Topsent). I am inclined to think that these spicules, so conspicuous in the few other species of Halicnemia, may be regarded as elongated microxea, and that their presence or absence is not of generic importance. Nor do I imagine that *H. constellata*, on account of its pseudasters, need be considered as the type of a distinct genus.

109. *Halicnemia salomonensis* n. sp.

(Plate **17**, fig. 9 *a*—*c*.)

The sponge forms a rather thin, irregular crust, of a pale greyish yellow colour, spreading over a very irregular calcareous pebble (nullipore?). The surface is coarsely hispid owing to the projection of the long tylostyles. No vents were seen.

The skeleton consists of long, smooth, stout tylostyles, subtylostyles and styles, arranged, for the most part, more or less at right angles to the base of attachment. The soft tissues between these spicules are densely charged with spined microxea.

Spicules:—(1) Tylostyli (Plate **17**, fig. 9 *a*); long, smooth, usually irregularly curved; usually thickest about the middle and tapering gradually to both extremities; with a fairly well-developed head, usually of "enormispinulate" type, and usually a finely pointed apex. Size up to about 2·2 by 0·069 mm. These more typical megascleres pass into much more slender, simple styli of about the same length (fig. 9 *b*).

(2) Spined microxea (acanthoxea) (fig. 9 *c*); fusiform, gradually sharp-pointed at each end; gently curved or slightly angulated in the middle; uniformly beset with feebly developed spines, sometimes nearly smooth; size very variable, up to about 0·14 mm. by 0·005 mm., but usually smaller.

This species differs from others of the same genus in the absence of the long, centrotylote oxea (tornota of Topsent).

Register Number, Locality, &c. CXXIV. 4, Salomon, 3.7.05, 75 fathoms.

Genus Acanthoxifer Dendy [1905].

Heteroxyeæ with a dense spicular cortex broken up into polygonal plates by pore-bearing grooves. Main skeleton a confused reticulation of oxea. Cortical skeleton composed chiefly of dense brushes of oxea arranged at right angles to the surface. Megascleres smooth and spined oxea. Microscleres trichodragmata.

When I first proposed this genus I overlooked the already existing genus *Myrmekioderma*, founded by Ehlers [1870] for the reception of Esper's *Alcyonium granulatum*, from the East Indies. Judging from Ehlers' detailed description of this species it seems quite possible that *Acanthoxifer* may be a synonym of *Myrmekioderma*, but Ehlers says nothing about the existence of trichodragmata and, for the present at any rate, the two may conveniently be kept distinct.

110. *Acanthoxifer ceylonensis* Dendy [1905].

There are several specimens of this remarkable sponge in the collection but they agree so closely in all respects with the Ceylon types that it is unnecessary to give any further description.

Previously known Distribution. Gulf of Manaar (Dendy).

Register Numbers, Localities, &c. LII. 5, LIII. 9, 10, 11, 13, Coetivy; CX. 5, Egmont Reef.

Family **Clavulidæ.**

Monaxonellid Sigmatotetraxonida in which the typical microsclere is a pseudaster with an elongated axis. Very occasionally chelæ are present; more frequently all microscleres are suppressed. The megascleres are typically tylostylote and frequently radially arranged, especially towards the surface. The sponge is frequently corticate, with a special cortical skeleton.

The scope of this family is almost identical with that of Vosmaer's sub-order Clavulina as employed in Bronn's *Klassen und Ordnungen des Thierreichs* (Porifera, p. 328), and adopted in the Report on the "Challenger" Monaxonida, the principal difference being the exclusion of the genus Stylocordyla, which I now regard as having in all probability originated independently from a Tetillid ancestor.

In recent years the various sub-families comprising the Clavulidæ have, with very general consent, been regarded as belonging to the astrotetraxonid line of evolution. So long ago as 1902, however, in his paper "On the shape of some siliceous spicules of sponges," Vosmaer showed that the "spiraster" is not a true aster at all, but a modified monaxon. This fact alone would hardly have sufficed to justify the transference of the

family to the Sigmatotetraxonida, for spiny microrhabds are by no means uncommon in the Astrotetraxonida, and it might be supposed that they had simply supplanted true asters.

On the other hand the alleged occurrence of chelæ in association with so-called discasters (discorhabds) in Schmidt's *Sceptrella regalis* [1870] has long been felt as an anomaly that required explanation if these sponges were really Astrotetraxonida. The explanation which I myself formerly adopted was that the association was accidental, but in view of the remarkable discoveries of the "Sealark" expedition this explanation must now be abandoned.

As will be seen presently, the new genera Barbozia, Didiscus and Sigmosceptrella demonstrate in a very conclusive manner the desmacidonid origin of, at any rate, the Spirastrellinæ, for, in addition to a primitive type of discorhabd, the first possesses abundant chelæ which are unquestionably proper to the sponge, while the second, although it no longer contains chelæ, still possesses echinating tylostyles associated with its peculiar oxydiscorhabds.

I have also been able to show, quite recently, that the discorhabd in the new genus Sigmosceptrella arises from a sigmoid protorhabd and must therefore be regarded as belonging to the sigmatose series of microscleres. We may therefore conclude, with some degree of confidence, not only that the Clavulidæ are modified Desmacidonids, but also that they have sprung from the ectyonine division of that group.

The three sub-families into which the Clavulidæ are here divided, viz. Spirastrellinæ, Clioninæ and Suberitinæ, are by no means sharply marked off from one another. The Spirastrellinæ are undoubtedly the most primitive of the three and the Suberitinæ seem to have originated from them simply by loss of microscleres. Indeed one cannot draw a hard and fast line even between the genera Spirastrella and Suberites as at present understood. It is amongst the Spirastrellinæ, then, that the origin of the pseudasters must be sought and we shall return to this question after giving a diagnosis of the sub-family.

Sub-family **Spirastrellinæ.**

Non-boring Clavulidæ with pseudastrose microscleres of various forms, chelæ rarely present.

If we may judge from the form and from what is known of the development of the pseudaster (discorhabd) in Barbozia, Didiscus, Sceptrella, Sigmosceptrella and Latrunculia, which, for various reasons, are probably to be regarded as more primitive genera than Spirastrella, it would seem that this spicule arose by the appearance of discs, or whorls of outgrowths, on an elongated axis.

I have recently [1917] given an account of the development of the discorhabd in two species of the genus Latrunculia, while early stages of the corresponding spicule in Didiscus and Sigmosceptrella are shown in Plate **18**, figs. 3 *c'*—*c'''* and 4 *c*. It is obvious in these cases that the whorls of outgrowths are secondary features and have nothing to do with the rays of true asters*. The transition from Latrunculia through Sigmosceptrella to Spirastrella is so gradual that we can hardly avoid extending the same conclusion to the pseudasters (spinispiræ) of that genus also.

* Cf. also Dendy and Nicholson [1917].

In the genera Barbozia and Didiscus the axis of the pseudaster (discorhabd) is either straight or but slightly curved. In Latrunculia it also remains straight but the whorls of outgrowths may show indications of torsion. In Sigmosceptrella the young discorhabd is actually sigmoid and frequently shows torsion. In Spirastrella, on the other hand, the axis has become bent in a spiral, zig-zag fashion, and the spines are distributed along its length instead of being collected in whorls. The axis of this spinispira may also become greatly abbreviated and the spines crowded together, and this leads, in the genus Timea (and in Hemiasterella?), to the formation of a spicule which is indistinguishable, at any rate in the adult condition, from a euaster. Finally, in the genus Placospongia, the original spinispira develops into a spicule which is almost indistinguishable from the sterraster of Geodia, with which, indeed, it was for a long time confounded.

It is evident that, in considering the relationships of the genera in this sub-family, it is necessary to make very full allowance for the phenomenon of convergence so frequently met with amongst sponges. The pseudasters here appear to be of quite different origin from the pseudasters of such genera as Cyamon and Trikentrion. The latter are undoubtedly also modified Ectyonines, but their pseudasters—at any rate in the case of Cyamon and probably, by analogy, in that of Trikentrion also—are derived from the spiny bases of the echinating acanthostyles, as I have already pointed out in dealing with the Cyamoneæ (p. 107). The development of pseudasters from spined isochelæ in *Hymedesmia crux* and *H. ænigma* [cf. Lundbeck 1910] appears as another case of convergence, but the sigmatose origin of the pseudasters in Sigmosceptrella suggests a closer relationship between the forms in question than might at first sight be suspected*.

The "Sealark" collection is very rich in generic representatives of the Spirastrellinæ. In addition to the new genera Barbozia, Didiscus and Sigmosceptrella, it contains species of Spirastrella, Timea, Placospongia and Hemiasterella. Other very interesting genera which are not represented in the collection, but which I think must also be assigned to the sub-family, are Sceptrella, Podospongia, Negombo, Trachycladus and Axos.

Genus Barbozia n. gen.

Spirastrellinæ with pore-areas on the summits of papillæ. Skeleton reticulate. Megascleres diactinal, oxeote or strongylote. Microscleres palmate anisochelæ and discorhabds, the latter not radially arranged in a special surface layer.

This remarkable new genus is named in honour of the well-known zoologist J. V. Barboza du Bocage, the founder of the genus Latrunculia. The character of the canal system, with its raised pore-areas, and the occurrence of the discorhabds are sufficient to establish a close relationship between Latrunculia and Barbozia. The association of chelæ and discorhabds has, as stated above, already been described in Schmidt's genus Sceptrella [1870] and Schmidt himself suggested that the loss of chelæ in a Sceptrelline ancestor may have given rise to the genus Latrunculia. Subsequently, also, he described [1875] a species without chelæ under the name *Sceptrella triloba*, which is probably a Sigmosceptrella.

Hitherto I have refused to accept the genus Sceptrella, which was very imperfectly described, and regarded the association of the discorhabds with chelæ as probably accidental.

* For further discussion of the origin of pseudasters *vide* Dendy [1921].

The discovery of Barbozia, however, indicates that Schmidt's description was probably correct so far as it goes. Unfortunately he says nothing of the megascleres, so that we cannot be certain what the characters of the genus Sceptrella really are, but the form of the chelæ and of the discorhabds, and the arrangement of the latter in a well-defined dermal layer, indicate that it is probably quite distinct from Barbozia.

The retention of the chelæ seems to indicate very clearly that Barbozia is a more primitive genus than Latrunculia, and the discorhabds of this genus are therefore perhaps the most primitive form of the spicule known. The strongly marked differentiation of the two ends of the discorhabd in some species of Latrunculia (e.g. *L. apicalis*) may perhaps be regarded by some as a result of their radial arrangement in a surface layer, but the fact that the spicule develops in the interior of the sponge constitutes a difficulty in the way of attributing this differentiation directly to mechanical causes [cf. Dendy 1917, 1921].

111. *Barbozia primitiva* n. sp.

(Plate **8**, fig. 9; Plate **18**, fig. 1*a*—*e*.)

The single specimen (Plate **8**, fig. 9) is massive, hemispherical, flat below, where it has evidently been cut off from the substratum. The upper surface bears three groups of prominent vents, two or three in each group and each vent occupying the summit of a short, thin-walled, conical projection. It also carries numerous hollow, thin-walled, pore-bearing papillæ in various stages of development. When fully grown these papillæ appear to be more or less compressed laterally and may measure as much as 4 mm. in height by 4 mm. in maximum diameter. They are truncated at the top, where the pore-bearing area is situate. Between these papillæ the surface is much encrusted with a thin coating of foreign organisms (Reniera &c.). The oscular projections and pore-bearing papillæ are fragile and easily broken, but the texture of the sponge as a whole is compact, solid and incompressible. The colour in spirit is very pale yellow. The maximum diameter of the almost circular base is 75 mm.; the maximum height of the sponge about 45 mm.

The main skeleton is a dense and extremely confused reticulation of oxea and strongyla, with no distinct fibre and no spongin, but with a more or less pronounced tendency for the megascleres to arrange themselves in very dense tracts, with more or less vacant intervals (free from megascleres) between. There is an especially dense dermal or cortical layer of megascleres, varying up to about 0·34 mm. in thickness, supported on short, thick pillars of spicules springing from the main skeleton and with more or less extensive sub-dermal cavities between them. The megascleres of the cortex lie in various directions, but for the most part tangentially. Immediately around the vents they arrange themselves side by side at right angles to the vent margin, and in the pore-areas at the ends of the pore-bearing papillae they form dense brushes at right angles to the surface. There appears to be no difference between the cortical (dermal) megascleres and those in the interior of the sponge, and there is no dermal layer of discorhabds.

Megascleres:—(1) Strongylote (Plate **18**, fig. 1*a*); usually slightly curved or bent, equal-ended, narrowing somewhat at the two ends, which are broadly rounded off; size commonly about 0·35 by 0·013 mm.

(2) Oxea (fig. 1*b*); slightly curved, often distinctly biangulate; gradually and finely pointed at each end; size commonly about 0·266 by 0·01 mm. Intermediate forms are rarely met with.

Microscleres:—(1) Palmate anisochelæ (fig. 1*c*, *c'*), of the form shown in the figure, about 0·02 mm. long; very numerous. The small end is often minutely apiculate.

(2) Oxydiscorhabds (fig. 1*d*), consisting of a slender shaft, sharply pointed at each end and bearing two whorls of sharp spines, each whorl placed at about one quarter of the total length of the shaft from one end. The typical number of spines in each whorl appears to be six. Length of shaft usually about 0·036 mm., with spines 0·007 mm. long. A few larger individuals, up to 0·057 mm. in length, are to be found. These spicules, though very numerous, are not so abundant as the chelæ. Neither form of microsclere shows any special arrangement.

A remarkable abnormal spicule (fig. 1*e*), observed only once, intermediate in size and form between the ordinary oxea and the oxydiscorhabds, suggests very strongly the presence of two rings of formative cells responsible for the whorls of spines in the latter, as in the case of the Latrunculia discorhabd [Dendy 1917].

In external characters, including the arrangement of the pores and vents, this species agrees closely with typical species of Latrunculia, such as *L. bocagei* and *L. apicalis*, figured in the Report on the "Challenger" Monaxonida (Plate XLIV). The encrustation of the surface by foreign organisms suggests a reason for the development of the raised pore-areas, although that reason may no longer exist in many species exhibiting this character.

The condition of the material does not allow one to say very much as to the minute anatomy and histology, but the following observations made upon sections stained with borax carmine may be of interest. There is a thick, gelatinous ectosome, composed almost entirely of collenchymatous tissue, but there is a thin layer of fibrous tissue developed in the deeper part of the wall of the hollow pore-bearing papillæ.

The outer part of the ectosome contains the dense cortical skeleton. The inner part is highly lacunar, containing the larger and smaller subdermal (or subcortical) cavities, which are continuous with the cavities of the pore-bearing papillæ. The choanosome is broken up into irregular inhalant and exhalant regions, interlocking with one another in a very complex manner. The former are really continuations of the lacunar, gelatinous ectosome and contain the branches of the inhalant canal-system. They correspond roughly with the spicule-bearing tracts referred to in the description of the skeleton. The latter, which surround branches of the exhalant canal-system, are at once distinguished by their more compact and granular appearance. They are crowded with flagellate chambers, which are spherical in shape and about 0·02 mm. in diameter, with very finely granular mesogloea between. I am unable to say anything definite as to the mode of opening of the chambers, but the character of the mesogloea and a radial arrangement of very narrow exhalant canals around much wider ones, which is sometimes recognizable, suggests that they are possibly aphodal or diplodal. I am inclined to think, however, that they are really eurypylous.

Register Number, Locality, &c. LXXII. 1, Amirante, 11.10.05, E. 10, 22—85 fathoms.

111*a*. *Barbozia primitiva* var. *digitata* nov.

(Plate **8**, fig. 10; Plate **18**, fig. 2.)

This variety differs from the type of the species chiefly in external form, the sponge consisting of irregular, digitiform processes springing from an encrusting base and each terminating in a prominent vent (Plate **8**, fig. 10). The pore-bearing papillæ are abundantly scattered over these processes as well as on the encrusting base, which is much mixed up with calcareous débris, foraminifera, &c. (especially *Gypsina plana*). The largest process is about 55 mm. long and 12 mm. in diameter in the middle; it is sharply bent like a crooked finger and has evidently had a branch, which is now broken off. There is another fragment (R.N. CXXV. 8) from the same jar, growing on a similar mass of calcareous débris (in association with *Hymedesmia lævissima*), which does not (in its present damaged condition) show any finger-shaped processes. Both specimens are now of a deep chocolate brown colour but this is almost certainly due to staining by another sponge in the same jar (probably *Plocamia massalis*).

This variety also differs from the type of the species in the somewhat more slender character of the megascleres.

Register Numbers, Locality, &c. CXXV. 5, 8, Mauritius, 23.8.05, A. 2, > 100 fathoms.

Genus Didiscus n. gen.

Spirastrellinæ with spicular cortex divided into polygonal areas by contractile pore-grooves. Main skeleton reticulate, with a good deal of spongin. Principal megascleres diactinal, typically oxeote. Echinating tylostyles may be present. Cortical skeleton consisting of a feltwork of diactinal megascleres and a dermal layer of discorhabds.

This genus is proposed for one of the most interesting novelties in the collection. The presence of the discorhabds and their arrangement in the type species indicate a close relationship to Latrunculia, while their form is intermediate between those of a typical Latrunculia and those of Barbozia. Whereas, however, *Barbozia primitiva* shows its close relationship to the Desmacidonidæ by the possession of abundant chelæ, *Didiscus placospongioides* shows a similar relationship by its echinating tylostyles, which, as already pointed out, seem to indicate an ectyonine origin for the Spirastrellinæ.

As a second species of the genus we may provisionally regard Ridley and Dendy's *Latrunculia* (?) *acerata* [1887]. *Didiscus aceratus* is, however, very imperfectly known, owing to the very bad condition of the only specimen, and may prove to belong to a distinct, though closely related genus. It is extremely unfortunate that the locality from which *Didiscus aceratus* was obtained by the "Challenger" expedition is uncertain, but probably it came from the South Atlantic.

A third species may possibly be represented by a "sceptrella" spicule figured by Mr Carter as coming from the root-tufts of a Euplectella from the Seychelles [1879 B, Plate XXIX, fig. 20], and a fourth by the fossil spicule described and figured by Hinde and Holmes [1892] under the name *Latrunculia obtusa*, from the tertiary deposits of Oamaru, New Zealand.

112. *Didiscus placospongioides* n. sp.

(Plate **7**, fig. 10; Plate **18**, fig. 3 *a*—*c*‴.)

Sponge (Plate **7**, fig. 10) repent (?), irregularly cylindrical, slightly branched. Surface smooth, but with a curiously crumpled appearance and marked out into large, irregular, polygonal areas by low, narrow, angular ridges which are not very conspicuous.

These ridges are seen in section to represent closed grooves, which contain the inhalant pores and probably also the vents. In some parts of the surface deep furrows with prominent margins probably represent the grooves in an open condition. The single specimen measures about 65 mm. in length by 8 mm. in average diameter. Colour in spirit very light yellowish grey (with a pinkish tinge which is probably accidental, as there were many other sponges in the same jar). Texture fairly firm but compressible and resilient. The whole external appearance of the sponge curiously resembles that of species of Placospongia, for which it might easily be mistaken at first sight.

The main skeleton, in the interior of the sponge, consists, in the first place, of very loose longitudinal bands of long, slender oxea, crossed here and there by spicules and spicule-bundles at various angles. From the more superficial parts of this main skeleton dense brushes of spicules arise which run, more or less at right angles, to the surface, where they spread out in a radiate fashion to form a close cortical feltwork of tangentially disposed oxea several spicules deep. In the neighbourhood of the pore-grooves the cortical oxea tend to run at right angles to the margins of the latter, which are thus protected by their apices. The main skeleton, in the interior of the sponge, is strengthened by spongin cement, which unites the megascleres with one another in a very irregular fashion. It is also sparsely echinated by tylostyles.

Between the spicule-bundles and separate megascleres of the main skeleton, and extending outwards to the cortex, is a rather loose network of slender fibres ranging from about 0·004 to about 0·02 mm. in diameter, or even more at the nodes. This network is difficult to detect except in stained preparations. It is continuous with the spongin cement which binds the megascleres together but is itself quite free from spicules. The substance of which it is composed, like the spongin cement, stains deeply with borax carmine, but the fibres exhibit a fibrillated appearance hardly like that of ordinary spongin fibres. They are, however, much more resistant than the soft tissues of the sponge, which, unfortunately, have almost completely disappeared owing to imperfect preservation.

On the surface of the sponge, immediately outside the layer of cortical oxea, is a single layer of closely packed oxydiscorhabds, arranged radially, usually with their smaller discs and shorter apices outwards. Similar spicules also occur abundantly scattered in the interior of the sponge and there is a dense layer of them in or beneath the floor of the pore-grooves, overarched, when the groove is closed, by the dermal cortex.

Megascleres:—(1) Oxea (Plate **18**, fig. 3 *a*); rather slender, smooth, slightly curved, gradually and sharply pointed at each end; very variable in size, ranging from about 0·04 by 0·0014 mm. to 1·4 by 0·02 mm.; the largest in the interior of the sponge, where they are for the most part arranged lengthwise.

(2) Tylostyli (fig. 3 *b*); smooth, straight, gradually sharp-pointed at the apex and with

irregularly polytylote base; size very variable, say about 0·16 by 0·008 mm.; sparsely echinating the spicular fibre in the interior.

Microscleres:—Oxydiscorhabds (fig. 3*c*); shaft slender, oxeote, fusiform, slightly bent or curved, gradually and finely pointed at each end, minutely roughened, especially towards the apices, when fully grown. With two discs, larger and smaller; the larger one in the middle of the shaft and the smaller one at about one-third of the distance from the middle to the corresponding end of the shaft. The larger disc is distinctly concave towards the smaller and the smaller more nearly flat. Both discs have an irregularly crenate margin. Length of shaft about 0·09 mm., with maximum diameter of 0·005 mm.; diameter of larger disc 0·018 mm., of smaller disc 0·012 mm.

The development of the oxydiscorhabds (figs. *c'*—*c'''*) shows clearly that they are derived from smooth microxea by the addition of two annular discs, which are at first extremely thin and narrow and indeed hardly visible, accompanied by thickening and roughening of the shaft. The youngest stages are, so far as I can see, indistinguishable from the youngest stages of the oxeote megascleres. The position of the discs appears to be determined by the fact that the developing spicule at the critical stage is thrown into vibration by the water-currents passing through the sponge, the initial cells, responsible for the formation of the discs, settling down at or near the nodes, or points of least vibration [Dendy and Nicholson 1917].

It is unfortunate that the state of preservation of this very remarkable sponge does not admit of any observations on the flagellate chambers. The extensive maceration of the interior of the specimen is indeed very remarkable and seems to imply a very delicate, gelatinous mesoglœa, with presumably eurypylous chambers. The cortex, which is only about 0·13 mm. thick, including the layer of discorhabds, consists almost entirely of spicules, with a gelatinous mesoglœa. The floor of the pore-grooves, however, contains an abundance of fibrous (fibrillar) tissue.

This species, as already indicated, is evidently closely related to Ridley and Dendy's *Latrunculia* (?) *acerata*, of which a single very badly preserved specimen was brought home by the "Challenger" expedition from a doubtful locality, possibly Tristan da Cunha, and nothing at all resembling which has, I believe, since been recorded. There are so many differences in details of spiculation, however, that there can be no question of specific identity. The curious discorhabds are essentially the same, but in *Didiscus aceratus* they are much smaller and with the shaft blunted at both ends, while they do not appear to be radially arranged at the surface. Perhaps, however, the most important distinction lies in the absence of the echinating spicules from the "Challenger" species. The "Challenger" material was so badly preserved that practically nothing can be said of the external form and we do not even know whether or not pore-grooves occur in that species.

Register Number, Locality, &c. LXXVIII. 13, Cargados Carajos, 28.3.05, B. 2, 30 fathoms.

Genus Sigmosceptrella n. gen.

Spirastrellinæ with microscleres in the form of discorhabds, which typically form a surface crust. The discorhabd develops from a sigmoid form, but acquires secondarily a straight axis; in other words, it is a sigmodiscorhabd.

I have been able to show [1917] that in typical species of Latrunculia (*L. bocagei* and *L. apicalis*) the protorhabd which forms the foundation of the discorhabd is a straight rod. Quite recently I have found that in my *Spirastrella fibrosa*, referred by Vosmaer to the genus *Latrunculia*, the protorhabd is strongly sigmoid, with the two ends bent back parallel to the shaft. This is also undoubtedly the case with the species about to be described under the name *quadrilobata*, for the young discorhabd, even after the deposition of a considerable amount of silica and the commencement of the formation of the spiny whorls (Plate **18**, fig. 4 *c*), is still sigmoid in form. I hope to give a detailed account of the development of these remarkable spicules at an early date [Dendy 1921] and in the meantime will content myself with saying that in the adult form the space between the recurved portions and the shaft becomes filled up with silica and all trace of the sigmatose origin is normally lost (Plate **18**, fig. 4 *b*).

This curious developmental history of the discorhabd seems alone sufficient to justify the generic separation of the species in which it occurs. So far as we yet know positively these species are only two in number—*Sigmosceptrella fibrosa* and *S. quadrilobata*—but it seems almost certain that several other described species will have to come in with them.

The new genus differs from Sceptrella, of course, in the absence of typical chelæ and from Spirastrella in the presence of the discorhabd instead of the spinispira. The discorhabd of Sigmosceptrella may, however, approach very closely to the spinispira of Spirastrella and the two genera appear to be very nearly related. The transition between the two forms of spicule is very well shown in Carter's figures of "*Latrunculia*" *corticata* (1879 B, Plate XXVII, fig. 1), which I have little hesitation in referring to the genus Sigmosceptrella, more especially as I find that the supposed "acerate" spicules described by Carter may with equal justice be regarded as reduced styli.

113. *Sigmosceptrella quadrilobata* n. sp.

(Plate **18**, fig. 4 *a*—*c*.)

There are several specimens of this species in the collection, encrusting, in association with *Timea unistellata* and other things, a horny sponge. The general appearance of the specimens reminds one closely of Chondrilla. They form irregular, spreading crusts, about 2 mm. in thickness. The upper surface appears smooth to the naked eye, but minutely and evenly punctate under a lens. A very few small, widely scattered papillæ bear each a minute vent, now closed. The inhalant pores seem to be collected in small groups at frequent and fairly regular intervals, each group protected by a tent-like arrangement of the projecting ends of megascleres. It is apparently these small tent-like groups of spicule-points that give the minutely punctate appearance to the surface. The colour in spirit is now dark chocolate brown, but this may be due to accidental staining, as everything in the same jar was stained the same colour.

There is a very sharply defined, strongly fibrous cortex, about 0·2 mm. thick, the outer two-thirds, or thereabouts, of which is densely charged with discorhabds. The cortex is interrupted at intervals by cylindrical plugs of tissue which project into it from the

underlying choanosome. These extend for about half or two-thirds of the way through the cortex. They contain inhalant canals, which probably communicate with the overlying dermal pores by narrower canals piercing the outer part of the cortex. Owing to the strong contraction that the sponge has undergone the actual pores are not visible and, moreover, the plug of choanosomal tissue often seems to have shrunk away from the cortical tissue, leaving a wide, chone-like space, which seems to be an artefact. The whole arrangement suggests comparison with that described by Ridley and Dendy for *Latrunculia apicalis* [1887], but in that species the pore-areas are elevated above the surrounding surface as cylindrical projections.

The main skeleton is composed of dense and well-defined spicular fibres which spring from the basal lamina and run towards the surface almost parallel with one another, branching as they go but not anastomosing. All the fibres and their branches seem to extend as far as the cortex but only a few spicules penetrate the latter. These fibres are composed of the characteristic styli of the species, which also occur sparsely and irregularly scattered in the soft tissues between them. I have not been able to satisfy myself of the presence of spongin in the fibres but the spicules seem to be held together by something, which may be only fibrous tissue.

Spicules:—(1) Styli (Plate **18**, fig. 4 *a*); smooth, straight, usually sharp-pointed; usually distinctly though not very strongly polytylote; size about 0·3 by 0·008 mm.

(2) Sigmodiscorhabds (fig. 4 *b*—*c*); with two principal whorls of spines, each typically divided into four branched lobes, and in addition a tuft of from one to about five spines at each end of the shaft. The shaft may be slightly twisted, so that the lobes of the two whorls do not come quite opposite to one another. The number of spines at the two ends of the spicule may be the same or different. These spicules occur in several layers in the outer part of the cortex, with their long axes at right angles to the surface. They are also thickly scattered at the base of the sponge, and less abundantly in the intervening choanosome. Slender juvenile forms are occasionally met with and the youngest (fig. 4 *c*) show very clearly the origin of this discorhabd from a sigmoid form.

This species is evidently nearly related to Schmidt's "*Sceptrella*" *triloba* [1875] from the North Sea, but differs in the four-lobed instead of three-lobed character of the whorls of the discorhabd and probably also in the arrangement of the inhalant pores. It also seems to be very closely related to "*Latrunculia*" *biannulata* Topsent [1892 c], from the North Atlantic, but that species is so inadequately described that I do not venture upon an identification. The most interesting relationship, however, is with my "*Spirastrella*" *fibrosa* from the neighbourhood of Port Phillip Heads [1897], which I regard as the type species of the genus Sigmosceptrella. The discorhabds of this species come very near to those of *Sigmosceptrella quadrilobata* but the whorls appear to be usually three-lobed instead of four-lobed; moreover, the inhalant pores are scattered and not collected in pore-sieves and the habit is lobose and branching instead of thinly encrusting.

Register Number, Locality, &c. CXXVI. 4 A, C, D, Mauritius, 23.8.05.

Genus Spirastrella Schmidt [1868].

Spirastrellinæ of usually massive form. Skeleton reticulate. Megascleres styli or tylostyli, scattered or in ill-defined fibres. Microscleres spinispiræ.

In the absence of detailed information as to the early development of the characteristic spinispiræ it would be unsafe to say much as to the actual derivation of this cosmopolitan genus. Its close relationship to Sigmosceptrella is obvious and the transitional forms of microsclere observed in the latter indicate very clearly that the spinispira is a modified discorhabd.

In another direction Spirastrella merges quite gradually into Timea and in yet another into Suberites.

It appears to me very difficult to accept Vosmaer's view that all the described species of Spirastrella, some forty in number, should be included under the same specific name (*Spirastrella purpurea*). Even if that distinguished spongologist is correct as to the existence of a more or less complete series of intermediate forms this would hardly justify such a drastic procedure in the present state of our knowledge, and a logical extension of the same principle would probably sooner or later oblige us to widen still further the limits of the single "species" so as to include perhaps all the known species of Sigmosceptrella, Timea and Suberites. The existence of an extraordinary number of connecting links in sponges cannot, of course, be denied, and it is to this fact that the group largely owes its surpassing interest from the evolutionary point of view, but there is still a great deal of hard work to be done in the way of building up the phylogenetic tree before we can hope to cut it up into "tropes" or any other philosophically-conceived units in a satisfactory manner. In the meantime it seems desirable that as many fixed points as possible should be accurately determined taxonomically and that these points should be represented by "species" named in accordance with the established rules of priority. A philosophical rearrangement of all the described species can only be the ultimate task of the systematist.

114. *Spirastrella vagabunda* Ridley [1884 c].

(For Literature and possible Synonymy *vide* Dendy [1905] and Vosmaer [1911].)

Although there are a considerable number of specimens in the collection the "Sealark" material does not add greatly to our knowledge of this common and widely distributed Indian Ocean species. Several more or less distinct varieties are represented.

The finest specimen is R.N. cxxxix., from Cargados Carajos (dry). It consists of a massive base which first enlarges and then contracts upwards to a broad apex, subdivided into three lobes, on which are situated numerous vents, now partially obliterated by contraction. The surface of the sponge is more or less rugose longitudinally, the ridges frequently developing into irregular proliferations which do not bear vents. Numerous wide longitudinal canals run vertically upwards and terminate in the vents. The specimen measures about 260 mm. in height by about 250 mm. in greatest breadth and is perhaps the largest sponge in the whole collection. R.N. xl. and lxxvii. 3, also from Cargados Carajos, agree closely with this specimen but are much smaller, and R.N. lvii. 9, from

Coin Peros, does not differ greatly. These specimens seem to approach most nearly to the type of the species as described by Ridley.

R.N. LVII. 2 (Coin Peros), LXVIII. 1 (Diego Garcia), XCII. 1 (Amirante) and CXIX. 7 (Salomon), consisting each of a solitary, tubular, digitiform process terminating in a single vent; rather flabby and thin-walled, and sometimes giving off accessory processes, are clearly referable to my variety *tubulodigitata*, from Ceylon Seas and Okhamandal, figured in my Report on the Okhamandal Sponges [1916 A].

R.N. CXXIX. 2 (Seychelles) is rather peculiar. The usual encrusting sandy base rises up into a very thick, digitiform process terminating in a broad rounded extremity. A single much smaller process is given off obliquely from near the bottom of the large one. In the middle of the broad extremity of each process there appears to be a single very minute vent, now closed. The surface of the sponge, except towards the apices, is longitudinally corrugated. When cut open the sponge shows a thick wall of very compact, firm tissue surrounding a thick core of gelatinous tissue, and there are no wide canals. The specimen measures about 85 mm. in height and the greatest breadth of the base is 73 mm. This variety seems to agree very closely with the specimen from the Gulf of Manaar which I identified [1905] with Ridley's *Spirastrella vagabunda* var. *trincomaliensis*. I am afraid that that identification was hardly justifiable. If a varietal name is needed it might be called var. *gelatinosa*.

R.N. CX. 3 (Egmont) and CXIX. 8, 15 (Salomon) are single digitiform processes which appear to end blindly; they may be imperfect or immature.

R.N. LX. (Diego Garcia) is a compressed, lobose specimen, with a single good-sized vent at the summit, forming the termination of a wide oscular tube lined by an easily separable membrane in which numerous tylostyles are arranged in a somewhat plumose fashion. Spinispiræ appear to be almost entirely absent; I have only seen two—rather large and robust. This specimen seems to approach my *Spirastrella* (*Suberites*) *inconstans* [1887].

All the above specimens are evidently closely related to one another and fall within the limits which, in the present state of our knowledge, may reasonably be assigned to Ridley's species *Spirastrella vagabunda*.

For further particulars as to the distribution of that species I may refer to my memoirs on the Ceylon and Okhamandal Sponges [1905, 1916 A].

115. *Spirastrella decumbens* Ridley [1884 C].

(For possible synonymy *vide* Vosmaer [1911].)

There are two thinly encrusting specimens in the collection which agree very closely with Ridley's original description of the type from Torres Straits. The larger (R.N. LIII. 4) measures about 47 by 22 mm., with a thickness of only about 2 mm. The other is closely similar. The colour of the larger one is light chocolate brown, but the contents of the jar containing it appear to have been accidentally stained. The smaller one (in spirit) is dull greenish grey. The tylostyles are straight, with well-developed oval heads, and measure about 0·4 by 0·0085 mm. They occur scattered in the interior and in bundles running towards the surface. The spinispiræ are very numerous; for the most part short and

robust, but with small ones intermingled. They are thickly scattered in the interior and also form a dense dermal crust.

This is a well-marked and widely distributed form, included by Vosmaer in his "tropus" *tegens* of *Spirastrella purpurea*, but I do not think that much is gained by departing from Ridley's original name. Whether or not the species, if we may still so call it, is identical with Schmidt's *Tethya* (*Suberites*) *bistellata* I do not profess to decide. I find it hard to believe that it can be specifically identical with *Spirastrella purpurea*, as Vosmaer maintains, and I even doubt now whether the supposed variety from the Philippines, collected by the "Challenger," should be included in the same species as Ridley's type.

Previously known Distribution (of the typical form). Torres Straits (Ridley); Red Sea (Keller); ? Adriatic (Lendenfeld); Amboina (Topsent).

Register Numbers, Localities, &c. LIII. 4, Coetivy; CXX. 14, Salomon, 10—14 fathoms.

116. *Spirastrella globularis* n. sp.

(Plate **4**, fig. 5 *a*, *b*; Plate **18**, fig. 5 *a*, *b*.)

The specimen (Plate **4**, fig. 5 *a*) which I regard as the type of this species consists of an almost globular head attached to the end of a short (?) and slender stalk, which has been broken off below so that its full length cannot be ascertained. The head measures 20 mm. in maximum diameter, while the stalk is only about 6 mm. in diameter where it joins the head and is now only 6 mm. in length, tapering away below. The surface is minutely granular but only slightly uneven. There is a single very minute vent, visible only with a lens, situate on a small papilla in the middle of the upper surface. The texture is firm and compact and the colour in spirit light yellowish brown.

The main skeleton is a very irregular reticulation of stout, loose spicular fibres, apparently with no spongin and with many spicules irregularly scattered between them. There is a cortical skeleton about 0·5 mm. thick, formed of a dense feltwork of spicules, many, but by no means all of which lie at right angles or nearly at right angles to the surface, with their apices projecting outwards. In the stalk the skeleton is composed almost entirely of longitudinal spicule-bundles closely packed together.

Megascleres:—Stylote to tylostylote (Plate **18**, fig. 5 *a*); very variable in size and irregular in shape. The larger ones, especially characteristic of the interior of the sponge, are often very crooked, often with "enormispinulate" heads and often with irregular apices; size commonly about 0·53 by 0·016 mm. The smaller ones, especially characteristic of the cortex, seem to be less irregular and may measure about 0·25 by 0·0082 mm.

Microscleres:—Slender spinispiræ (fig. 5 *b*), commonly angulated some three or four times; about 0·02 mm. long. Not very abundant and not forming a dermal crust.

A second specimen (R.N. CXIX. 14), from Salomon, is also quite distinctly stipitate and closely resembles the type in external appearance, though the surface is rather more uneven and partially covered with low conuli. The diameter of the globular body is about 15 mm. and the length of the stalk 10 mm., with a thickness of about 5 mm. The skeleton arrangement and spiculation agree closely with those of the type but I have been able to find only one or two spinispiræ, so that at first I placed the specimen in the genus Suberites.

R.N. LVI. 2 and LVII. 5, both from Coin Peros, may also possibly belong to this species. They agree fairly closely with the type in skeletal characters but they are sessile rather than stipitate (R.N. LVI. 2 seems to have been attached by a very broad base) and of much darker colour, so that it is very doubtful.

So far as I know, nothing has hitherto been described in the genus Spirastrella which at all closely resembles the characteristic stipitate form of the two typical specimens of this sponge, and the fact that these two specimens came from two slightly different localities seems to support the view that they represent a distinct species.

Register Numbers, Localities. LVII. 6, Coin Peros; CXIX. 14, Salomon.

Spirastrella spp.

There are a number of other small specimens of Spirastrella, to which, in view of the great taxonomic difficulties presented by this genus and the insufficiency of the material at my disposal, I refrain from attaching specific names, but those who accept Vosmaer's views can, of course, call them all *Spirastrella purpurea.*

Register Numbers, Localities, &c. VII. 4, Saya de Malha, 6.9.05, C. 15, 55 fathoms; LVI. 2, LVII. 5, Coin Peros; LXVIII. 2—4, Lagoon, Diego, 12.7.05, 10 fathoms; CXI. 3, Egmont Reef.

Genus TIMEA Gray [1867 F].

Spirastrellinæ of thinly encrusting habit. Megascleres smooth tylostyli. Microscleres pseudoeuasters of various forms, occasionally passing into spinispiræ.

In my Report on the Ceylon Sponges [1905] I followed Carter and Topsent in the use of the name Hymedesmia for this genus, although Thiele [1903 B] had already adopted that name for a different genus and stated (in a footnote) that Gray's genus Timea should be employed for species congeneric with Bowerbank's *Hymedesmia stellata* [1866, 1874].

More recently Lundbeck [1910] has accepted Thiele's views and described a very large number of species of Hymedesmia, some of which are of extraordinary interest.

Bowerbank's type of his genus Hymedesmia was *H. zetlandica* [1866, 1874], an Ectyonine sponge with acanthostylote and diactinal megascleres, and isochelæ and sigmata for microscleres, and thus very different from *H. stellata* with its tylostyles and asters.

There seems to be no justification for Topsent's having [1892 D] placed *H. zetlandica* in his own genus Leptosia while retaining Bowerbank's name Hymedesmia for *H. stellata* and other species congeneric therewith.

I must therefore agree with Thiele and Lundbeck that Topsent's Leptosia must be abandoned in favour of Hymedesmia and that Gray's genus Timea must be revived for *H. stellata* and its allies.

The derivation of this curious genus from a Spirastrella ancestor is very clearly indicated by the existence of such intermediate forms as *Spirastrella* (*Tethya*) *bistellata* Schmidt [1862], *Timea* (*Hymedesmia*) *tristellata* Topsent [1900] and *Timea* (*Hymedesmia*) *curvistellifera* Dendy [1905], in which occur pseudasters which are strictly intermediate

between those of Spirastrella and those of a typical Timea, such as *T. stellivarians* Carter; while, on the other hand, such thinly encrusting Spirastrellas as *S. bistellata* and *S. decumbens* Ridley, form perfect transitions as regards external form. In view of the several ways in which it is possible for a pseudaster to be developed, however, we must not lose sight of the possibility that the genus may be of polyphyletic origin.

117. *Timea stellivarians* (Carter).

Hymedesmia stellivarians Carter [1880 B]. *Hymedesmia stellivarians* Dendy [1905].

The single specimen of this species agrees very closely with the specimen recorded by me from Ceylon. The characteristic feature of the species appears really to be the differentiation of the fully developed pseudaster into two very distinct categories, the one with conical, smooth rays and the other with cylindrical, capitate rays, the heads being often roughened or minutely spined.

Previously known Distribution. Gulf of Manaar (Carter); Ceylon (Dendy).

Register Number, Locality, &c. LXXIII. 1 A, Amirante, 11.10.05, E. 14, 36 fathoms.

118. *Timea unistellata* (Topsent).

Hymedesmia unistellata Topsent [1892 D, 1900].

I identify with this species a thinly encrusting specimen of considerable extent, attached to the surface of a horny sponge. The tylostyles have well-developed oval heads and usually measure about 0·225 by 0·004 mm., and are thus somewhat shorter than those of the type (0·37—0·4 by 0·003—0·004 mm.). The spherical pseudasters are not sharply differentiated into two kinds and have about thirteen simple, smooth, conical rays about as long as the diameter of the centrum. The total diameter of the fully grown spicule may reach 0·029 mm., but most of them are a good deal smaller. Occasionally, especially in the larger ones, the rays of the pseudaster, instead of being perfectly smooth, are roughened or even slightly thickened at the apices, exactly as described and figured by Topsent for one of his specimens.

Topsent states that the colour in life of the type is salmon or brick red. The "Sealark" specimen was in a jar in which everything had been stained brown, presumably by pigment dissolved out from some of the specimens.

Previously known Distribution. Mediterranean (Topsent).

Register Number, Locality, &c. CXXVI. 4 B, Mauritius, 23.8.05.

Genus PLACOSPONGIA Gray [1867 E].

Spirastrellinæ with a strong spicular axis and a similar cortex, both composed of closely packed sterrospiræ; with bundles of tylostyles radiating from the axis towards the periphery. Cortex divided into polygonal areas by grooves containing the inhalant and exhalant apertures.

119. *Placospongia carinata* (Bowerbank).

(For Literature and Synonymy *vide* Vosmaer and Vernhout [1902] and Dendy [1905].)

This well-known and highly characteristic Indian Ocean species is represented in the collection by some very good specimens. It was also present in Professor Herdman's Ceylon collection and in Mr Hornell's collection from Okhamandal.

Previously known Distribution. Tropical seas between 30° N. and 20° S. of the equator (Vosmaer and Vernhout, &c.).

Register Numbers, Localities, &c. XLII. 5, Cargados Carajos, 30.8.05, B. 9, 30 fathoms; LIII. 7, Coetivy; LXXXV. 2, Egmont Lagoon Shoal.

Genus Hemiasterella Carter [1879 a].

Spirastrellinæ of cup-like or plate-like external form. The main skeleton consisting of loose columns of megascleres which may be partially cemented together by spongin. Megascleres ranging from tylostylote to oxeote. Microscleres pseudoeuasters. Canal system eurypylous.

This genus was proposed by Carter in 1879 for the two species *Hemiasterella typus* and *H. affinis*, both, unfortunately, according to Carter's description, of unknown locality*.

In 1888, in his Report on the "Challenger" Tetractinellida, Sollas proposed the new genus Epallax for a cup-shaped, "aster"-bearing sponge from the south-west of New Guinea. He placed this genus in the Axinellidæ and, in referring to Carter's *Hemiasterella typus*, remarked (p. 434) "This appears to closely resemble *Epallax callocyathus* (see p. 423), should subsequent examination prove the two sponges to be congeneric, my name must be suppressed in favour of Carter's." There can, I think, be no doubt of the generic identity of the two.

Hemiasterella affinis was removed by Sollas to his genus *Dorypleres*, but I have no doubt, after examination of the types, that Carter was right in assigning the species to Hemiasterella.

In 1903 Kirkpatrick proposed yet another genus, Kalastrella, for a cup-shaped, "aster"-bearing sponge from South Africa, which he assigned to the Spirastrellidae under the name *Kalastrella vasiformis* [1903]. As regards the systematic position of this genus I agree with Kirkpatrick, but as to the genus itself I have no doubt that it also must be regarded as a synonym of Hemiasterella.

The characters of the pseudaster indicate the genus Timea as perhaps the nearest in relationship to Hemiasterella. The derivation of the pseudaster in the former genus has been discussed already, but I may point out especially in the case of Hemiasterella that the general arrangement of the skeleton and the development of spongin seem clearly to indicate a sigmatotetraxonid rather than an astrotetraxonid origin. I may also point out that the larger pseudasters in *Hemiasterella* (*Epallax*) *callocyathus* somewhat resemble those of Cyamon, and suggest a possible derivation from that genus, the origin of the pseudasters of which has already been discussed in this Report (*see* under Cyamoneæ).

* The type-slide of *H. typus* in Mr Carter's cabinet is, however, labelled "Australia."

120. *Hemiasterella intermedia* n. sp.

(Plate **7**, fig. 11; Plate **18**, fig. 6 *a—h*.)

The single specimen (Plate **7**, fig. 11) has the form of a very thick-walled, funnel-shaped cup, tapering away below to form a short stalk. The cavity of the cup is rather shallow, the margin rounded and uneven. The total height of the specimen is about 18 mm., the diameter of the mouth of the cup about 15 mm., the average thickness of the wall of the cup about 5 mm. The outer surface is rather uneven and sparsely hispid, and shows numerous small, ill-defined pore-areas. The inner surface is also uneven and hispid and shows indications of minute scattered vents under a pocket lens. The colour in spirit is white, the texture fairly firm and compact.

Stained sections show that the principal inhalant and exhalant canals run at right angles to the outer and inner surfaces of the wall of the cup. The outer ends of the large inhalant canals merge into an extensive system of shallow subdermal cavities, covered over by the pore-bearing dermal membrane. The appearance of small pore-areas on the outer surface thus seems to be deceptive, these areas probably indicating merely the positions of the deep inhalant canals.

Beneath the inner surface of the cup there is also an extensive series of subdermal cavities, which open to the exterior by small scattered vents. From these subdermal cavities the wide exhalant canals are separated by thin, pore-bearing membranes.

There is no true cortex and the boundary between ectosome and choanosome cannot be made out, but the pseudasters, everywhere enormously abundant, increase in numbers towards the surface until they form an almost solid layer.

The flagellate chambers are scattered in the abundant mesoglœa between the large inhalant and exhalant canals, which give off numerous branches very much smaller than themselves. The chambers are approximately spherical and only about 0·02 mm. in diameter; they appear to be eurypylous. The ground-substance between them is rather coarsely granular, the granules being mostly small nuclei (?).

The skeleton consists chiefly of the extraordinarily abundant pseudasters, but there are also sparse, plumose columns of megascleres, mostly long styli, radiating upwards through the wall of the cup, and the projecting ends of some of these megascleres give rise to the hispidation of the surface. It is important to notice that these very loose skeleton columns are strengthened by a considerable amount of spongin cementing the spicules together where their bases approach one another.

Spicules:—(1) Smooth styli (Plate **18**, fig. 6 *a*, *b*); of two principal types but not sharply distinguishable from one another, (*a*) slender, slightly curved, evenly rounded off at the base, very gradually sharp-pointed at the apex; measuring about 1·9 by 0·022 mm.; sometimes rather longer and stouter, occasionally strongylote (fig. 6 *c*); (*b*) much stouter and somewhat shorter, measuring about 1·5 by 0·05 mm.

(2) Oxea (figs. 6 *d*, *e*); slightly curved, fusiform, of about the same size as the stout styli, with which they are connected by intermediate forms; sometimes more slender.

(3) Pseudasters of two principal varieties, but not sharply distinguishable from one another, (*a*) with small centrum and about 10 bluntly pointed, distinctly roughened rays

(fig. 6 *f*); total diameter about 0·029 mm.; (*b*) similar and of about the same size, or smaller in varying degrees, but with smooth, conical, sharp-pointed rays (fig. 6 *h*); these pass into (*a*) by intermediate stages (fig. 6 *g*) and may be merely young forms, but they are very numerous.

This species is evidently closely related to the four species of Hemiasterella already known, all of which are cup-shaped sponges. From *Hemiasterella typus* Carter [1879 A] it differs in the possession of oxeote as well as stylote megascleres and in the much more pronounced roughening of the rays of the fully developed pseudaster. Carter describes the rays of the pseudaster in *H. typus* as being smooth, but I find from examination of a slide in his cabinet that they are sometimes slightly roughened towards the tip and by no means always sharply pointed. Perhaps a more important difference lies in the fact that *H. typus* contains numerous very small pseudasters with slightly tylote rays, which are absent from *H. intermedia*.

From *Hemiasterella affinis* Carter [1879 A] our species would seem to differ in the presence of stylote as well as oxeote megascleres, but I am afraid, after examination of one of Mr Carter's slides, that he has overlooked the occurrence of styli in *H. affinis*, as he may also have overlooked the occurrence of oxea in *H. typus*. *H. affinis* also has the minute pseudasters with faintly tylote rays and the rays of the large pseudasters seem to be either quite smooth or very nearly so.

In the character of its pseudasters our species approaches more nearly Kirkpatrick's *Hemiasterella* (*Kalastrella*) *vasiformis* [1903], but it differs from that species in the absence of the tylostyles, and possibly in other respects also.

Lastly, *Hemiasterella intermedia* differs widely from Sollas's *H.* (*Epallax*) *callocyathus* [1888] in the form both of the pseudasters and of the principal megascleres.

[Since this Report was written an account has been published by Topsent [1919] of a new species of Hemiasterella from the East coast of Madagascar, to which he has given the name *Hemiasterella complicata*. This species is evidently very closely related to ours, but since there seems to be considerable difference in the dimensions both of the megascleres and microscleres I have decided not to make an identification for the present.]

Register Number, Locality, &c. XIX. 3, Providence, 4.10.05, D. 4, 50—78 fathoms.

Sub-family **Clioninæ**.

Clavulidæ which have the habit of perforating a calcareous substratum. The typical megascleres are tylostyli and the typical microscleres pseudasters.

There appears to be little doubt that these sponges are directly descended from Spirastrelline ancestors and indeed it is open to question whether the boring habit is sufficient to justify the maintenance of a separate sub-family for their reception.

Genus CLIONA Grant [1826].

Clioninæ in which the typical spiculation consists of tylostyles only, to which, however, spinispiræ and rhaphides are sometimes added.

121. *Cliona celata* Grant [1826].

(For Literature and Synonymy *vide* Topsent [1900].)

There is in the collection a large, empty gasteropod shell (belonging to *Vasum* sp.) beautifully perforated with this ubiquitous boring sponge. The growth appears to be perfectly normal, the sponge coming to the surface at frequent intervals in the form of small round plugs filling the circular apertures in the shell. The specimen agrees very closely with the admirable description given by Topsent of the European form. With the exception of two spinispiræ in a boiled out preparation I have seen only tylostylote spicules, which appear to be perfectly typical, measuring about 0·32 by 0·008 mm. According to Topsent spinispiræ are produced only in youth and the typical spiculation consists of tylostyles only, though some specimens develop oxea in addition. These so-called oxea appear really to be rhaphides and are commonly arranged in bundles (trichodragmata), and it seems quite possible that Sollas was right in considering the specimens which possess them as belonging to a distinct species (*Cliona linearis*).

Previously known Distribution. Cosmopolitan (for details *vide* Topsent [1900]).

Register Number, Locality, &c. XXXI. Cargados Carajos, 30.8.05, B. 17, 20—25 fathoms.

Sub-family **Suberitinæ**.

Clavulidæ of free-living habit and without either chelæ or pseudasters. Usually the only spicules are tylostyli, sometimes passing into styli.

Genus Suberites Nardo [1833].

Suberitinæ of varying form, usually massive, but without well-defined mammiform projections on the surface. Megascleres nearly always tylostylote, usually arranged radially, with surface brushes of spicules smaller than those of the main skeleton. No microscleres of any kind.

122. *Suberites cruciatus* Dendy var. *depressa* nov.

Suberites cruciatus Dendy [1905, 1916 A].

This variety differs from the type of the species in its rather thinly encrusting habit. The specimen on which it is based covers somewhat extensively an irregular mass of calcareous débris which it partially incorporates in its own substance. The surface shows the same small, translucent areas as in the type and the colour in spirit is pale greyish yellow. It agrees closely with the type in skeleton arrangement and spiculation. The main skeleton consists of loose wisps of tylostyles branching out into loose surface brushes composed of smaller spicules of the same kind. The largest spicules seem to be just a little larger than in the type, but the difference is very slight. The head of the tylostyle is formed by two or three rounded knobs exactly as in the type, but these always seem to be terminal, while in the type they are commonly, but not always, subterminal, with the base of the shaft projecting for a short distance beyond them.

This variety evidently comes very near to Schmidt's *Suberites lobiceps* from Florida

[1870], but the description of that species, consisting of a line and a half, although accompanied by two figures of the spicule, is hardly sufficient to justify an identification, especially as no spicular dimensions are given.

It also suggests that both *S. lobiceps* and *S. cruciatus* may prove to be identical with Lamarck's *Alcyonium epiphytum*, redescribed by Ridley [1884 c] under the name *Suberites epiphytum*; Ridley figures the spicules but unfortunately omits to refer to the figures in his text.

Previously known Distribution of the Species. Ceylon, Okhamandal (Dendy).

Register Number, Locality, &c. XCVIII. 3, Amirante, 9.10.05, E. 3, 25 fathoms.

Genus TERPIOS Duchassaing and Michelotti [1864] *emend.*

Thinly encrusting Suberitinæ of gelatinous consistence, with skeleton composed of slender tylostyles arranged without order or in loose wisps and brushes.

123. *Terpios fugax* Duchassaing and Michelotti.

(For Literature and Synonymy *vide* Topsent [1902].)

A single small specimen thinly encrusting a branch of an arborescent Polyzoon is evidently referable to this species as defined by Topsent. Even in alcohol and when mounted in Canada balsam it is of a deep metallic green colour. The slender tylostyles are arranged chiefly in loose radiating brushes; they measure about 0·2 mm. in length and their heads are broader than they are long.

Previously known Distribution. Almost cosmopolitan (for details *vide* Topsent, *loc. cit.*).

Register Number, Locality, &c. CXXVIII. 8 A, Seychelles, 20.10.05, F. 9, 37 fathoms.

Genus POLYMASTIA Bowerbank [1864].

Massive Suberitinæ with hollow, mammiform or cylindrical processes projecting from the surface, with strongly differentiated cortex enclosing a choanosome which may be more or less pulpy. The cortical skeleton consists typically of a deeper layer of large, tangentially placed spicules, often arranged in bundles or fibres, and a superficial layer of small, radially arranged spicules. Spicules tylostylote to stylote.

124. *Polymastia tubulifera* n. sp.

(Plate **4**, fig, 6; Plate **18**, fig. 7 *a—b'*.)

The single specimen (Plate **4**, fig 6) consists of a subglobular, saccular body about 13 mm. in diameter, with a single, large, conical projection on one side (probably the upper), apparently terminating in a vent, now completely closed. This projection is about 7 mm. long and 6 mm. broad at the base.

From other parts of the body radiate three long, slender, but stiff, cylindrical processes, about 20 mm. in length and only about 1 mm. in diameter. No point of attachment is recognizable and the sponge appears to have lain freely on the substratum. The body is enclosed in a thin cortex, only about half a millimetre thick, and the interior is filled with

the somewhat pulpy choanosomal tissue, which also partially fills the large conical process. The three slender filiform projections appear to be hollow tubes, at any rate in their present condition, and the only one which was examined microscopically appears to be closed at the extremity. The surface of the sponge to the naked eye appears smooth and clean and the colour in spirit is very pale yellow.

The skeleton of the interior of the sponge is very lax; a number of fairly stout and well-defined spicular fibres can, however, be easily seen with a pocket lens, running vertically (i.e. parallel to the long axis of the conical process) through the soft choanosome. These fibres are about 0·2 mm. thick. Otherwise the choanosomal skeleton consists of spicules of all sizes either scattered quite irregularly or aggregated in more or less well-defined bundles.

The general cortical skeleton consists of two well-defined layers. In the first place there is an irregular felt-work of large styli arranged tangentially, and outside this is a thin fur of very small, slender tylostyles arranged radially with their apices directed outwards. The structure of the cortex is continued in the walls of the slender fistular processes, with the addition of about half a dozen stout spicular fibres running longitudinally beneath the inner layer and arranged in a single circle. In the wall of the large conical process the longitudinal spicular fibres are more numerous and very stout, and the tangential spicules which lie between them and the surface fur are closely packed together and run transversely to the long axis of the process.

Spicules. (1) Long, straight styli or subtylostyli (Plate 18, fig. 7 *a*—*a*″); fusiform and tapering gradually to each end, so as to resemble oxea when viewed under a low magnification; the apex gradually and more or less finely pointed; the base suddenly narrowing towards the simply rounded or very slightly enlarged extremity. The diameter in the middle of the spicule is about seven times that of the base. These spicules measure up to about 2·25 by 0·033 mm.; though they are often much smaller. They occur in the soft choanosome, in the spicular fibres and in the tangential layer of the cortex.

(2) Small, slender tylostyli (fig. 7 *b*); with well-developed oval beads and long, fine points; the apical third of the spicule, or thereabouts, usually curved to one side. These spicules commonly measure about 0·12 by 0·002 mm. They are chiefly found in the surface fur but also occur abundantly in the choanosome. Similar forms of larger size (fig. 7 *b*′), sometimes about twice the length and three times the thickness, are not uncommon in boiled out preparations, though nothing like so abundant as the smaller ones.

This pretty little sponge is evidently nearly related to my *Polymastia gemmipara* from Okhamandal [1916 A]. It is probable that the slender tubular processes are homologous with the budding fistulæ of that species and that buds are formed on them at the proper time, though there is no trace of any in the specimen. The most noteworthy difference lies in the sizes of the spicules, for while the large styli are more than twice as long the small tylostyli of the surface fur are considerably smaller—and especially more slender—than the corresponding spicules in *Polymastia gemmipara*.

Register Number, Locality, &c. XIV., S. de Malha, 6.9.05, C. 12, 47 fathoms.

125. *Polymastia conigera* Bowerbank [1874].

There are in the collection two specimens from Saya de Malha which seem to me to be referable to this species, one of them (R.N. LXXX. B) in company with a specimen of *Trichostemma sarsii* on the same fragment. Each is cushion-shaped, approximately circular in outline, attached by a flat lower surface and with convex upper surface bearing a single very small mammiform projection near the middle, probably with an apical vent. The diameter of each is about 12 mm. and the colour in spirit white or nearly so. In R.N. LXXX. B the surface appears smooth under a pocket lens, while in R.N. XIII. 1 it is rather strongly hispid, but sections show that this is only a question of the degree to which the apices of the larger spicules project.

The skeleton arrangement is that of a typical Polymastia, at least so far as the body of the sponge is concerned ; I have not attempted to examine it in the very small mammiform projection. The surface fur of small tylostyles rests upon a thicker cortical layer of irregularly felted tylostyles of intermediate size. This is not mentioned by Bowerbank in his description but seems to be a characteristic feature of both Polymastia and Trichostemma [cf. Vosmaer 1885]. The choanosome contains numerous stout spicular fibres composed of long subtylostyles or tylostyles which run to the surface and terminate in brushes either in the cortex or projecting beyond it. Between these fibres are scattered numerous examples of the small tylostyles, mostly arranged in bundles or "dragmata," each containing about half a dozen, or sometimes more. These bundles are not mentioned by Bowerbank but they evidently correspond to the "stellate groups" of tylostyles described by Kirkpatrick in his *Polymastia invaginata* [1908 c].

The spicules agree very closely indeed with the descriptions and figures given by Bowerbank, both as to form and dimensions, and it is this agreement, rather than the external form, which has caused me to make the identification. The large tylostyles measure up to about 1·9 mm. in length, though usually a good deal shorter; they have quite well-developed, oval or subconical heads at the narrowed base and are characteristically polytylote, with a variable number of slight annular swellings in addition to the head—as described by Bowerbank (*loc. cit.* p. 194), though not shown in his figures. The small tylostyles are rather slender, measuring about 0·13 by 0·0041 mm., and have relatively large heads of sphero-conical form. Numerous intermediates occur between the two extremes. This description of the spiculation is taken from R.N. XIII. 1. R.N. LXXX. B agrees closely enough, but the large spicules do not seem to attain so large a size and their heads are less well developed, though the polytylote character is commonly quite distinct. The small tylostyles are a good deal more slender so that the head appears even larger in comparison with the diameter of the shaft.

This species is evidently very nearly related to *Trichostemma sarsii* and to Kirkpatrick's *Polymastia invaginata* and Thiele's *Polymastia insidis* [1905]. Indeed it is doubtful whether any of these species ought really to be regarded as distinct from *P. conigera*, and perhaps even whether that species itself ought ever to have been separated from *Polymastia mammillaris*, the type of the genus.

It may also be pointed out that the "Sealark" specimens approach very closely in external

form to *Suberites caminatus* Ridley and Dendy [1887] and indicate the impossibility of distinguishing sharply between the genera Suberites and Polymastia as at present understood.

Previously known Distribution. British Seas (Bowerbank).

Register Numbers, Locality, &c. XIII. 1, LXXX. B, Saya de Malha, 4.9.05, C. 2 and 3, 125 and 123 fathoms.

Genus TRICHOSTEMMA Sars [1869, 1872].

Suberitinæ of discoid or hemispherical form, with a marginal fringe of long spicules; free-living or attached; with one or more vents at the ends of short oscular tubes on the upper surface. Megascleres typically tylostylote.

I have nothing to add to the observations on the relationships of this genus in the Report on the "Challenger" Monaxonida. It is very doubtful if it is really distinct from Polymastia, with which it seems to be connected by intermediate forms.

126. *Trichostemma sarsii* Ridley and Dendy.

Trichostemma sarsii Ridley and Dendy [1886, 1887]. *Trichostemma Sarsi* Topsent [1892 c, 1904 A].

The "Sealark" expedition obtained three small specimens of this species. Two of them (R.N. V. 5 A and B) have the form of thin, flattened disks with a very well-developed spicular fringe. The total diameter, including the fringe, is about 15 mm. These two specimens closely resemble those described and figured in the "Challenger" Report. They appear to have lain quite freely on a sandy bottom and the lower surface exhibits a very beautiful, radially arranged spicular thatch, while the upper surface is covered with an incrustation of fine sand which conceals any vents that may have been present. In one the lower surface is flat and the upper one convex, while in the other these conditions are exactly reversed. The skeleton arrangement and spiculation agree very closely indeed with those of the types.

The third specimen, a little smaller in size, is attached by the lower surface to a fragment of shell and is less typical in form. The fringe is less well developed and less well defined and the spicular thatch on the lower surface is not recognizable, while the cortical skeleton of the upper surface is more confused.

Topsent [1913] has recently figured and described a number of specimens of *Trichostemma hemisphæricum* Sars from the North Atlantic, some of which very closely resemble *Trichostemma sarsii*, and it now seems to me quite possible that the latter species may be a mere synonym of the former. I await further evidence, however, before definitely committing myself to this view. (See also under *Polymastia conigera*, p. 150.)

Previously known Distribution. Off the Azores and near Torres Straits (Ridley and Dendy); North Atlantic, Azores (Topsent).

Register Numbers, Localities, &c. V. 5 A, B, S. de Malha, 7.9.05, C. 20, 3—500 fathoms; LXXX. A, Saya de Malha, 4.9.05, C. 2, 125 fathoms.

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DESCRIPTION OF PLATES.

Plate 1.

Fig. 1. *Taprobane herdmani* Dendy. Exhalant surface of dry specimen. R.N. CXLVII. $\times \frac{2}{3}$.
Fig. 1 *a*. *Taprobane herdmani* Dendy. Part of exhalant surface of same specimen as shewn in Fig 1. $\times 1\frac{1}{4}$.
Fig. 2. *Petromica massalis* Dendy. R.N. XCVI. 1. Nat. size.
Fig. 3. *Cinachyra anomala* (Dendy). R.N. XXXIII. 4. $\times 1\frac{1}{5}$.
Fig. 4. *Cinachyra vaccinata* n. sp. R.N. LXVII. 2. $\times \frac{9}{10}$.
Fig. 5. *Cinachyra providentiæ* n. sp. R.N. XXI. 1. $\times \frac{9}{10}$.
Fig. 5 *a*. *Cinachyra providentiæ* n. sp. Cut surface of same specimen as Fig. 5, shewing (above) porocalices laid open. $\times \frac{9}{10}$.
Fig. 6. *Paratetilla bacca* (Selenka) var. *violacea* (Kieschnick). R.N. CXIX. 3. Nat. size.
Fig. 7. *Paratetilla bacca* (Selenka) var. *corrugata* nov. R.N. LIX. Nat. size.

Plate 2.

(All figures about natural size.)

Fig. 1. *Gelliodes carnosa* Dendy var. *laxa* nov. R.N. XLIV. 2.
Fig. 2. *Reniera tufoides* n. sp. Largest specimen. R.N. XCIII. Upper surface.
Fig. 2 *a*. *Reniera tufoides* n. sp. Edge of same specimen as represented in Fig. 2.
Fig. 3. *Petrosia seychellensis* n. sp. R.N. CXXVIII. 1.
Fig. 4. *Petrosia seychellensis* n. sp. R.N. LXXII. 3.
Fig. 5. *Halichondria retiderma* n. sp. R.N. XCVII. 1.
Fig. 6. *Clathria procera* (Ridley) R.N. LI. 1.
Fig. 7. *Clathria procera* (Ridley) R.N. LXXXIV.
Fig. 8. *Echinoclathria intermedia* Whitelegge. R.N. XXVII.
Fig. 9. *Plumohalichondria gardineri* n. sp. R.N. CIII. 1.

Plate 3.

(All figures about natural size.)

Fig. 1 *a*. *Reniera cribricutis* n. sp. R.N. LXXI. 10 A.
Fig. 1 *b*. *Reniera cribricutis* n. sp. R.N. LXXI. 10 B.
Fig. 2. *Reniera tuberosa* n. sp. R.N. VII. 3 A.
Fig. 3. *Halichondria aplysinoides* n. sp. R.N. LXXVII. 2.
Fig. 4. *Halichondria aplysinoides* n. sp. R.N. LXXVIII. 7.
Fig. 5. *Halichondria aplysinoides* n. sp. R.N. XLII. 3.
Fig. 6. *Chalina confusa* n. sp. R.N. LXXV. 3.
Fig. 7. *Ceraochalina differentiata* n. sp. R.N. CVII. 1.
Fig. 8. *Yvesia spinulata* Hentschel. R.N. XLIII. 1 A.

Plate 4.

Fig. 1. *Reniera ligniformis* n. sp. R.N. LXI. (restored). About natural size.
Fig. 2. *Plumohalichondria clathrodes* n. sp. R.N. CLI. (dry). $\times$ about $\frac{1}{2}$.
Fig. 3 *a*. *Acarnus topsenti* n. sp. R.N. XXX. 2. About natural size.
Fig. 3 *b*. *Acarnus topsenti* n. sp. R.N. XLII. 7. About natural size.

Fig. 4. *Cyamon vickersii* (Bowerbank). R.N. CIX. × 2.
Fig. 5 *a*. *Spirastrella globularis* n. sp. R.N. LVII. 6. About natural size.
Fig. 5 *b*. *Spirastrella globularis* n. sp. R.N. CXIX. 14. About natural size.
Fig. 6. *Polymastia tubulifera* n. sp. R.N. XIV. × 1½.

PLATE 5.

Fig. 1. *Mycale crassissima* (Dendy). R.N. LXXVII. 5. About natural size.
Fig. 2. *Clathria spicata* Hallmann. R.N. CXLIV. (dry). × about ⅝.
Fig. 3. *Clathria madrepora* n. sp. R.N. CXXX. About natural size.
Fig. 4. *Sigmaxinella durissima* (Dendy) var. *massalis* nov. R.N. LXXI. 1. About natural size.
Fig. 5. *Acanthella carteri* Dendy. Macerated skeleton. R.N. CXXXIII. 1. About natural size.
Fig. 6. *Acanthella pulcherrima* Ridley and Dendy var. *calyx* nov. R.N. LXXVIII. 9. About natural size.

PLATE 6.

(All figures about natural size.)

Fig. 1. *Clathria spongodes* n. sp. R.N. LXXIX. 2.
Fig. 2. *Ectyon ceylonica* (Dendy). R.N. LXXVIII. 15.
Fig. 3. *Hymedesmia lipochela* n. sp. R.N. XLIV. 3.
Fig. 4. *Phakellia conulosa* n. sp. R.N. XLII. 13.
Fig. 5. *Phakellia conulosa* var. *mauritiana* nov. Exhalant surface. R.N. CXXVI. 1.
Fig. 5 *a*. *Phakellia conulosa* var. *mauritiana* nov. Inhalant surface. R.N. CXXVI. 1.

PLATE 7.

Fig. 1. *Clathria whiteleggii* n. sp. R.N. VIII. 1. About natural size.
Fig. 2. *Colloclathria ramosa* n. sp. R.N. CXXXVIII. 1. About natural size.
Fig. 3. *Bubaris conulifera* n. sp. R.N. XXI. 11. About natural size.
Fig. 4. *Sigmaxinella durissima* (Dendy) var. *massalis* nov. R.N. XVIII. About natural size.
Figs. 5 *a*, 5 *b*. *Sigmaxinella durissima* (Dendy) var. *erecta* nov. R.N. CXXXIII. 2 and CXXXIII. 2 *bis*. About natural size.
Figs 6 *a*, 6 *b*. *Sigmaxinella durissima* (Dendy) var. *tethyoides* nov. R.N. VII. 2 and VII. 2 *bis*. About natural size.
Fig. 7. *Acanthella cavernosa* n. sp. R.N. LXXI. 7. About natural size.
Fig. 8. *Higginsia higgini* n. sp. R.N. LXIX. 2. About natural size.
Fig. 9. *Higginsia petrosioides* n. sp. R.N. CXXXII. 2. About natural size.
Fig. 10. *Didiscus placospongioides* n. sp. R.N. LXXVIII. 13. × 2.
Fig. 11. *Hemiasterella intermedia* n. sp. R.N. XIX. 3. × 3.

PLATE 8.

(All figures about natural size.)

Fig. 1. *Pachychalina subcylindrica* Dendy. R.N. XX. 1.
Fig. 2. *Oceanapia toxophila* n. sp. Body and detached fistula. R.N. XX. 2.
Fig. 3. *Phlœodictyon seychellense* n. sp. R.N. CXXIX. 1.
Fig. 4. *Phlœodictyon porosum* n. sp. R.N. LXXVII. 4.
Fig. 5. *Phlœodictyon polysiphonia* n. sp. Fragments. R.N. LXXXIII. 1.
Fig. 6. *Siderodermella ramosa* n. sp. R.N. CXXXIII. 6.
Fig. 7. *Axinella spiculifera* (Lamarck). R.N. XCII. 3.
Fig. 8. *Hymeniacidon conglomerata* n. sp. R.N. LXXVIII. 12.
Fig. 9. *Barbozia primitiva* n. sp. R.N. LXXII. 1.
Fig. 10. *Barbozia primitiva* var. *digitata* nov. R.N. CXXV. 5.

Plate 9.

Fig. 1 *a—p*. *Theonella pulchrifolia*. n. sp. R.N. cxxiii. 1.

1 *a*. Typical tetracrepid desma, × 117; 1 *b*. Tuberculate surface desma, showing (at *xx*) mode of interlocking, × 117; 1 *c—e*. Variations of the desma, × 110; 1 *f—k*. Phyllotriænes, views of cladome, × 305; 1 *l*. Less branched form of phyllotriæne, × 335; 1 *m*. Side view of phyllotriæne (optical section), showing greatly enlarged axial canal in shaft and in bases of cladi, × 305; 1 *n*. Dichotriæne, × 305; 1 *o*. Long, smooth microxea, × 565; 1 *p*. Short, roughened microxea, × 565.

Fig. 2 *a—g*. *Discodermia tuberosa* n. sp.

2 *a*. R.N. x. 5. Tetracrepid desma, × 120; 2 *b—d*. R.N. ix. 2 a. Discotriænes, × 110; 2 *e*. R.N. ix. 2 c. Young discotriæne, from just below the surface layer, before fusion of the cladi to form the disc, × 180; 2 *f*. R.N. ix. 2 a. Microxea, × 770; 2 *g*. R.N. ix. 2 a. Microstrongyla, × 770.

Plate 10.

Fig. 1 *a—k*. *Tetilla furcifer* n. sp. R.N. cxix. 13.

1 *a*. Vertical section through vent, showing arrangement of prodiænes, × 60; 1 *b*. Vertical section through outer part of cortex and bud, × 60; 1 *c*. Oxeon, × 60; 1 *d*. Style, × 60; 1 *e*. Large prodiæne, × 60; 1 *e'*. Cladomes of large prodiænes, × 310; 1 *f*. Large protriæne, × 60; 1 *f'*. Cladomes of large protriænes, × 310; 1 *g*. Cladome of large promonæne, × 310; 1 *h*. Small prodiæne, × 60; 1 *j*. Small protriæne, × 60; 1 *j'*. Cladome of small protriæne, × 310; 1 *k*. Sigmata, × 550.

Fig. 2 *a—f*. *Cinachyra providentiæ* n. sp. R.N. xxi. 1.

2 *a*. Large oxea, × 34; 2 *b*. Style, × 34; 2 *c*. Protriæne, × 60; 2 *c'*. Cladome of protriæne, × 310; 2 *d*. Anatriæne, × 60; 2 *d'*. Cladome of anatriæne, × 310; 2 *e*. Short, slender oxea, × 315; 2 *f*. Sigmata, × 550.

Fig. 3 *a—b*. *Cinachyra isis* Lendenfeld. R.N. cxxxiii. 4.

3 *a—a''*. Cladomes of protriænes, × 310; 3 *b*. Cladome of anatriæne, × 310.

Plate 11.

Fig. 1 *a—l*. *Cinachyra vaccinata* n. sp. (1 *a—b* from R.N. lviii., the remainder from R.N. lxvii. 2).

1 *a*. Bundles of hair-like protriænes and prodiænes, breaking up beneath porocalyx, × 60; 1 *a'*. Ends of shafts of small prodiænes and protriænes, frayed out from bundle, to show terminal enlargements, × 550; 1 *b*. Part of pore-membrane from porocalyx, showing pores and hispidating prodiænes, × 180; 1 *c*. Large oxeon, × 35; 1 *d*. Style, × 35; 1 *e*. Large prodiæne, × 130; 1 *e'*. Cladome of large prodiæne, × 330; 1 *f*. Protriæne of intermediate size, × 130; 1 *f'*. Cladomes of large protriænes, × 330; 1 *g*. Small prodiæne, × 130; 1 *g'*. Cladome of small prodiæne, × 330; 1 *h*. Small protriæne, × 130; 1 *h'*. Cladome of small protriæne, × 330; 1 *j*. Anatriæne, × 130; 1 *j'*. Cladome of anatriæne, × 330; 1 *k*. Short, slender oxea, × 315; 1 *l*. Sigmata, × 550.

Plate 12.

Fig. 1. *Reniera cribricutis* n. sp. R.N. lxxi. 10 a. Oxea, × 380.

Fig. 2. *Reniera tuberosa* n. sp. R.N. vii. 3 a. Oxea, × 380.

Fig. 3. *Reniera tufoides* n. sp. R.N. xciii. Oxeon, × 380.

Fig. 4. *Reniera ligniformis* n. sp. R.N. lxi. Oxea, × 380.

Fig. 5 *a—b*. *Petrosia seychellensis* n. sp. R.N. cxxviii. 1.

5 *a*. Stout oxea and strongyla, × 165; 5 *b*. Slender oxea, × 165.

Fig. 6. *Petrosia mammiformis* n. sp. R.N. cxxii. 2. Oxea, × 165.

Fig. 7 *a—b*. *Halichondria retiderma* n. sp. R.N. xcvii. 1.

7 *a*. Oxea, × 165; 7 *b*. Style, × 165.

Fig. 8. *Halichondria nigra* n. sp. R.N. liii. 5. Oxea, × 165.

Fig. 9. *Halichondria aplysinoides* n. sp. R.N. lxxvii. 2. Oxea, × 165.

Fig. 10. *Chalina confusa* n. sp. R.N. lxxv. 3. Oxea, × 380.

Fig. 11. *Ceraochalina differentiata* n. sp. R.N. cvii. 1. Oxea, × 380.

Fig. 12 *a—c*. *Oceanapia toxophila* n. sp. R.N. xx. 2.

12 *a*. Oxea, × 290; 12 *b*. Sigma, × 660; 12 *c*. Toxon, × 660.

Fig. 13 *a—b*. *Phlœodictyon seychellense* n. sp.
13 *a*. R.N. CXXIX. 1, oxeon, × 450; 13 *b*. R.N. LI. 2, oxea, × 450.
Fig. 14. *Phlœodictyon porosum* n. sp. R.N. LXXVII. 4. Oxea, × 450.
Fig. 15. *Phlœodictyon incrustatum* n. sp. R.N. CX. 2. Oxea, × 450.
Fig. 16. *Phlœodictyon polysiphonia* n. sp. R.N. LXXXIII. 1. Oxea, × 450.
Fig. 17 *a—b*. *Amphilectus* (?) *unguiculatus* n. sp. R.N. CXIII. 10.
17 *a*. Tylostyli, × 325; 17 *b*. Isochelæ, × 770.
Fig. 18. *Merlia* sp. Clavidisc, × 650.

PLATE 13.

Fig. 1 *a—e*. *Microciona atrasanguinea* Bowerbank. R.N. CX. 8.
1 *a*. Large styli, × 330; 1 *b*. Slender tylostyle, × 330; 1 *c*. Echinating acanthostyle, × 550; 1 *d*. Palmate isochelæ, × 1100; 1 *e*. Toxa, × 550.
Fig. 2 *a—f*. *Bubaris conulifera* n. sp. R.N. XXI. 11.
2 *a*. Strongyla, × 110; 2 *b*, *b'*, *c*. Oxea, × 110; 2 *d*. Short styli, × 110; 2 *e*. Long style, × 110; 2 *f*. Trichodragmata, × 460.
Fig. 3 *a—b*. *Bubaris salomonensis* n. sp. R.N. CXXII. 5.
3 *a*. Strongyla, × 110; 3 *b*. Styli, × 110.
Fig. 4 *a—f*. *Clathria spicata* Hallmann. R.N. XLII. 4.
4 *a*. Large tylostyles, × 330; 4 *b*. Acanthosubtylostyles, × 550; 4 *c*. Forms intermediate between 4 *a* and 4 *b*, × 330; 4 *d*. Long, slender tylostyles, × 330; 4 *e*. Palmate isochelæ, × 1100; 4 *f*. Toxon, × 550.
Fig. 5 *a—f*. *Clathria whiteleggii* n. sp. R.N. VIII. 1.
5 *a*. Large subtylostyles, × 330; 5 *b*. Acanthosubtylostyles, × 550; 5 *c*. Form intermediate between 5 *a* and 5 *b*, × 330; 5 *d*. Long, slender tylostyle, × 330; 5*e*. Palmate isochela, × 1100; 5 *f*. Toxon, × 550.

PLATE 14.

Fig. 1 *a—d*. *Clathria madrepora* n. sp. R.N. CXXX.
1 *a*. Large tylostyles, × 330; 1 *a'*. Possibly young forms of 1 *a*, × 330; 1 *b*. Acanthosubtylostyle, × 550; 1 *c*. Slender tylostyle, × 330; 1 *d*. isochela, × 1100.
Fig. 2 *a—d*. *Clathria spongodes* n. sp. R.N. LXXIX. 2.
2 *a*. Large tylostyles, × 330; 2 *b*. Acanthosubtylostyle, × 550; 2 *c*. Slender tylostyle, × 330; 2 *d*. Sigma, × 1100.
Fig. 3 *a—e*. *Clathria chelifera* (Hentschel.) R.N. CVIII. 3.
3 *a*. Styli, × 330; 3 *b*. Acanthostyles, × 550; 3 *c*. Strongylon, × 330; 3 *d*. Larger palmate isochela, × 1100; 3 *e*. Smaller palmate isochelæ, × 1100.
Fig. 4 *a—h*. *Colloclathria ramosa* n. sp. R.N. CXXXVIII. 1.
4 *a*. Stout style, × 330; 4 *b*. Acanthosubtylostyli, × 550; 4 *c*. Slender styli, × 330; 4 *d*. Palmate isochelæ, × 1115; 4 *e*. Forms intermediate in appearance between 4 *d* and 4 *f*, × 1115; 4 *f*. Colloscleres, × 1115; 4 *g*. Very minute isochela, × 1115; 4 *h*. Toxa, × 550.
Fig. 5 *a—c*. *Plocamia massalis* n. sp. R.N. CXXV. 2.
5 *a*. Acanthostrongyla, × 330; 5 *b*. Tylote, × 330; 5 *c*. Palmate isochelæ, × 1100.
Fig. 6. *Lithoplocamia lithistoides* n. sp. R.N. CXXXVII. 2. Acanthostrongyla.

PLATE 15.

Fig. 1 *a—c*. *Hymedesmia lævissima* n. sp. R.N. CXXV. 6.
1 *a*. Stout subtylostyles, × 290; 1 *b*. Slender tylostyle, × 290; 1 *b'*. Apex of slender tylostyle, × 1075; 1 *c*. Tridentate isochela, × 1075.
Fig. 2 *a*, *b*. *Hymedesmia lipochela* n. sp. R.N. XLIV. 3.
2 *a*. Stout subtylostyles, × 290; 2 *b*. Slender tylostyle, × 290.
Fig. 3 *a—d*. *Plumohalichondria clathrodes* n. sp. R.N. CLI.
3 *a*. Tornota, × 460; 3 *b*. Acanthostyles, × 460; 3 *c*. Larger tridentate isochela, × 1075; 3 *d*. Smaller tridentate isochelæ, × 1075.

Fig. 4 *a—d*. *Plumohalichondria gardineri* n. sp. R.N. CIII. 1.

4 *a*. Large acanthostyles, × 290; 4 *b*. Small acanthostyles, × 290; 4 *c*. Long, slender styli, × 170; 4 *d*. Long, slender oxea, × 290.

Fig. 5 *a—c*. *Hamigera papillata* n. sp. R.N. XIX. 1.

5 *a*. Subtylostyli, × 290; 5 *b*. Tylote, × 290; 5 *c*. Tridentate isochela, × 1075.

Fig. 6 *a—e*. *Forcepia stephensi* n. sp. R.N. LXXXII. A.

6 *a*. Tylostyle, × 460; 6 *b*. Tylote, × 460; 6 *c*. Tridentate isochela, × 1080; 6 *d*. Sigmata, × 1080; 6 *e*. Forceps, × 1080.

Fig. 7 *a, b*. *Crella cyathophora* (Carter) var. *acuata* nov. R.N. CXIII. 11.

7 *a*. Subtylostyli, × 550; 7 *b*. Acanthoxea, × 550.

Fig. 8 *a—e*. *Acarnus topsenti* n. sp. R.N. XXX. 2.

8 *a*. Styli and subtylostyle, × 550; 8 *b*. Clado-acanthostyli, × 550; 8 *c*. Tylota, × 550; 8 *d*. Palmate isochela, × 1090; 8 *e*. Toxa, × 550.

PLATE 16.

Fig. 1 *a—b'*. *Tedanione wilsoni* n. sp. R.N. XX. 6.

1 *a*. Strongylotylota, × 440; 1 *b*. Larger raphides, × 670; 1 *b'*. Smaller raphis, × 670.

Fig. 2 *a—d*. *Cornulella lundbecki* n. sp. R.N. CXXVIII. 1 A.

2 *a*. Tylote, × 280; 2 *b*. Palmate isochelæ, × 860; 2 *c*. Microrhabd, × 860; 2 *d*. Toxon, × 860.

Fig. 3 *a, b*. *Cornulum strepsichela* n. sp. R.N. XC. 1.

3 *a*. Tylota, × 330; 3 *b*. Palmate isochelæ, × 770.

Fig. 4 *a—e*. *Siderodermella ramosa* n. sp. R.N. CXXXIII. 6.

4 *a*. Tylote, × 170; 4 *b*. Tridentate isochelæ, × 1080; 4 *c*. Navicelliform isochelæ, × 1080; 4 *d*. Larger sigma, × 1080; 4 *e*. Smaller sigma, × 1080.

Fig. 5 *a—f''''*. *Cyamon vickersii* (Bowerbank). R.N. CIX.

5 *a*. Short, smooth styli or subtylostyli, × 108; 5 *b*. Strongylote, × 108; 5 *c*. Long, slender, smooth style (subtylostyle), × 108; 5 *d*. Slender styli of peculiar form, two with bulbous inflation (*x*), × 330; 5 *d'*. Variety of same without the characteristic bend, × 330; 5 *e*. Pseudotetract, × 550; 5 *e'*. Pseudopentact, × 550; 5 *e''*. Pseudotriact, × 550; 5 *e'''*. Pseudodiacts, × 550; 5 *f—f''''*. Developmental stages pseudotetracts, &c., × 550.

Fig. 6 *a—c*. *Sigmaxinella bihamigera* n. sp. R.N. XXIII.

6 *a*. Styli, × 70; 6 *b*. Large sigma, × 670; 6 *c*. Small sigmata, × 670.

PLATE 17.

Fig. 1 *a, b*. *Axinella bubarinoides* n. sp. R.N. CXXII. 1 A.

1 *a*. Short styli, × 165; 1 *b*. Long style, × 165.

Fig. 2 *a, b*. *Phakellia conulosa* n. sp. R.N. XLII. 13.

2 *a*. Short styli, × 110; 2 *b*. Long styli, × 110.

Fig. 3 *a, b*. *Acanthella cavernosa* n. sp. R.N. LXXI. 7.

3 *a*. Style, × 165; 3 *b*. Strongylote, × 165.

Fig. 4. *Hymeniacidon variospiculata* n. sp. R.N. CXXII. 7. Styli and tylostyli, × 110.

Fig. 5 *a, b*. *Hymeniacidon conglomerata* n. sp. R.N. LXXVIII. 12.

5 *a*. Styli, × 110; 5 *b*. Tylostyle, × 110.

Fig. 6 *a—c*. *Spongosorites salomonensis* n. sp. R.N. CXVI.

6 *a*. Large oxea (one strongylote), × 165; 6 *b*. Intermediate forms, × 165; 6 *c*. Small oxea, × 165.

Fig. 7 *a—e*. *Higginsia petrosioides* n. sp. R.N. CXXXII. 2.

7 *a*. Stout oxea, × 60; 7 *b*. Stout styli, × 60; 7 *c*. Stout strongyla, × 60; 7 *d*. Slender oxeon with bifid ends, × 325; 7 *d'*, 7 *d''*. Variations in ends of slender oxea, × 800; 7 *e*. Acanthoxeote, × 550.

Fig. 8 *a—f*. *Higginsia higgini* n. sp. R.N. LXV.

8 *a*. Long, slender oxea, × 60; 8 *b*. Long, slender style, × 60; 8 *c*. Short style, × 60; 8 *d*. Acanthoxea, × 550; 8 *e*. Subcentrotylote acanthoxeon, × 550; 8 *f*. Smooth, subcentrotylote oxea, × 550.

Fig. 9 *a—c*. *Halicnemia salomonensis* n. sp. R.N. CXXIV. 4.

9 *a*. Tylostyli, × 60; 9 *b*. Style, × 60; 9 *c*. Acanthoxea, × 550.

PLATE 18.

Fig. 1 *a—e*. *Barbozia primitiva* n. sp. R.N. LXXII. 1.

1 *a*. Strongyla, × 335; 1 *b*. Oxea, × 335; 1 *c*. Palmate anisochelæ, × 1095; 1 *c'*. Young anisochela, × 1095; 1 *d*. Oxydiscorhabds, × 1095; 1 *e*. Abnormal oxeote, approaching oxydiscorhabd in size and form, × 1095.

Fig. 2. *Barbozia primitiva* var. *digitata* nov. R.N. CXXV. 5. Palmate anisochelæ, × 1095.

Fig. 3 *a—c'''*. *Didiscus placospongioides* n. sp. R.N. LXXVIII. 13.

3 *a*. Oxea, × 103; 3 *b*. Tylostyli, × 266; 3 *c*. Oxydiscorhabds, × 1065; 3 *c'—c'''*. Developmental stages of oxydiscorhabd, × 1065.

Fig. 4 *a—c*. *Sigmosceptrella quadrilobata* n. sp. R.N. CXXVI. 4 A.

4 *a*. Styli, × 310; 4 *b*. Discorhabds, side views, × 770; 4 *b'*. Discorhabd, three quarters end view, × 770; 4 *b''*. Discorhabd, full end view, × 770; 4 *c*. Young discorhabd, showing sigmoid form, × 1750.

Fig. 5 *a, b*. *Spirastrella globularis* n. sp. R.N. LVII. 6.

5 *a*. Megascleres (stylote to tylostylote), × 230; 5 *b*. Spinispiræ, × 820.

Fig. 6 *a—h*. *Hemiasterella intermedia* n. sp. R.N. XIX. 3.

Fig. 6*a, b*. Styli, × 60; 6 *c*. Strongylote, × 60; 6 *d, e*. Oxea, × 60; 6 *f*. Pseudasters with rough, blunt rays, × 770; 6 *g*. Intermediate forms of pseudaster, × 770; 6 *h*. Pseudasters with smooth, sharp rays, × 770.

Fig. 7 *a—b'* *Polymastia tubulifera* n. sp. R.N. XIV.

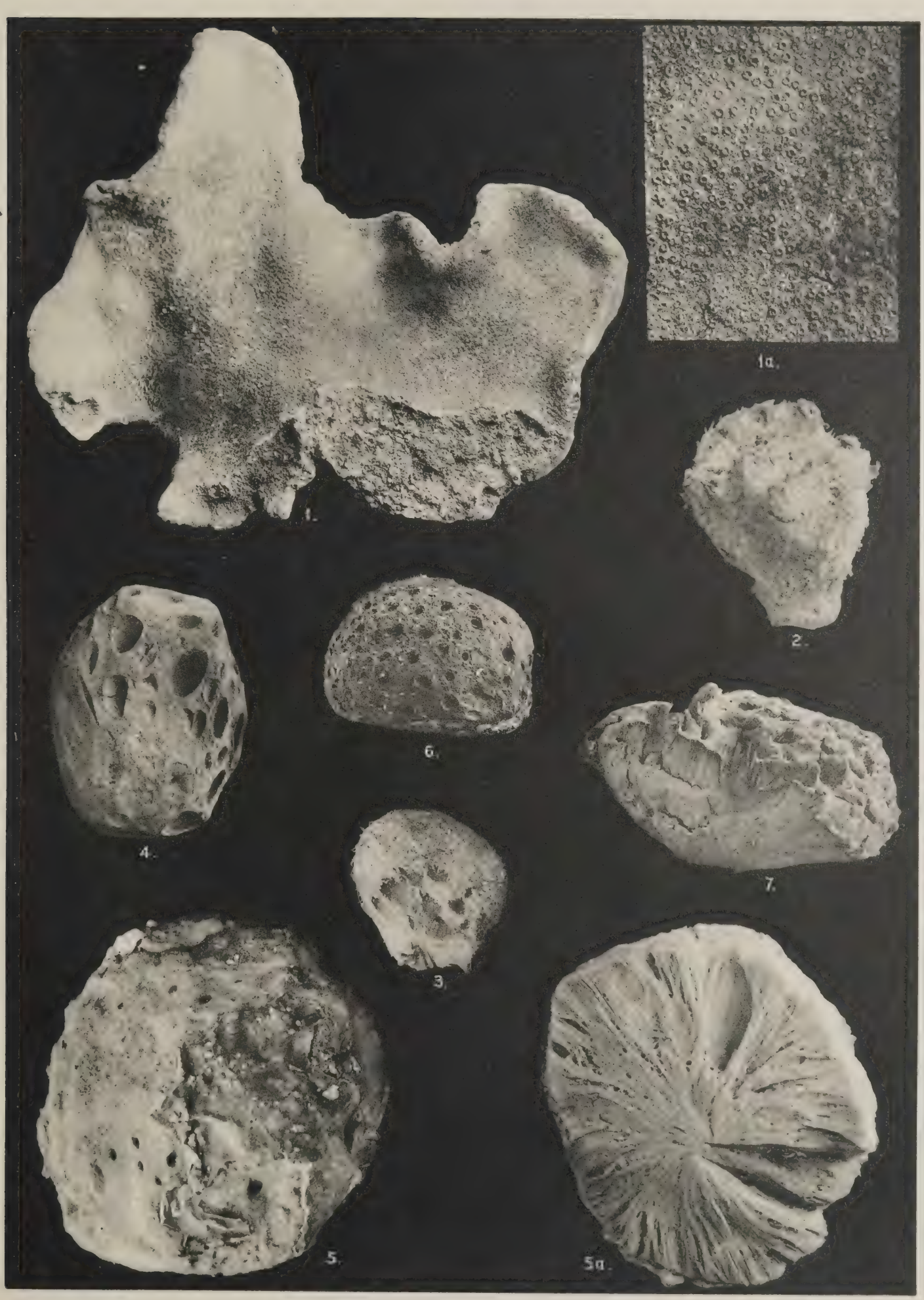
7 *a*. Large subtylostyle, × 90; 7 *a'*, *a''*. Base and apex of same, × 380; 7 *b*, *b'*. Small tylostyles, × 380.

POSTSCRIPT. JULY 1921.

The manuscript and illustrations for this Report were originally completed some years ago but the publication was delayed, first by the continuance of the war and later by financial difficulties arising therefrom. In the meantime some of the more interesting results have been made use of in other papers, especially in my recently published memoir on *The Tetraxonid Sponge-Spicule:—A Study in Evolution* [1921], which deals in a comprehensive manner with the spiculation of the Tetraxonida in general and must be regarded as expressing my latest views on the subject.

The Euceratosa of the "Sealark" Expedition still remain undescribed and it will not, I fear, be possible to include them in the present series of Reports.

The type-specimens of the new species of sponges described in these Reports will be found in the Natural History Department of the British Museum.



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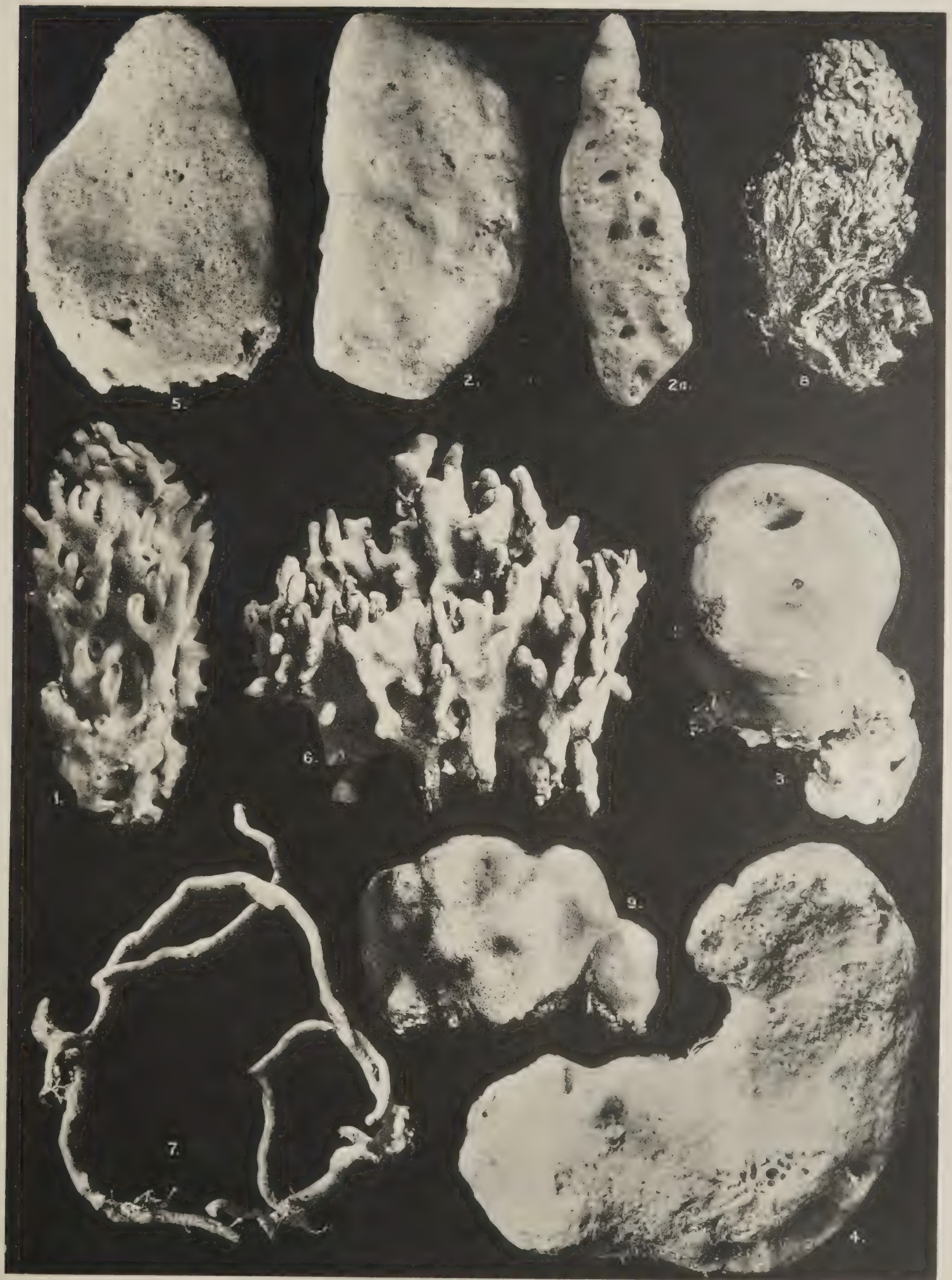

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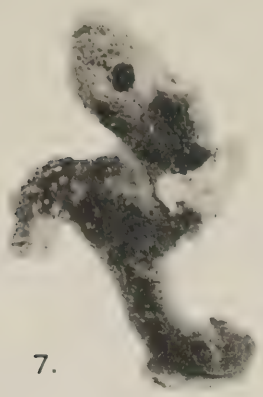

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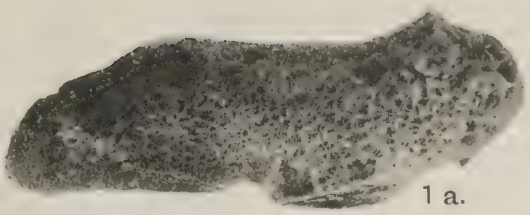

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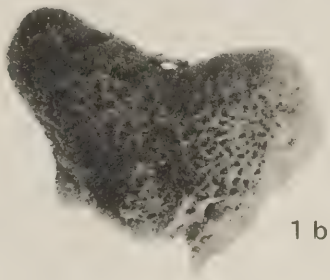

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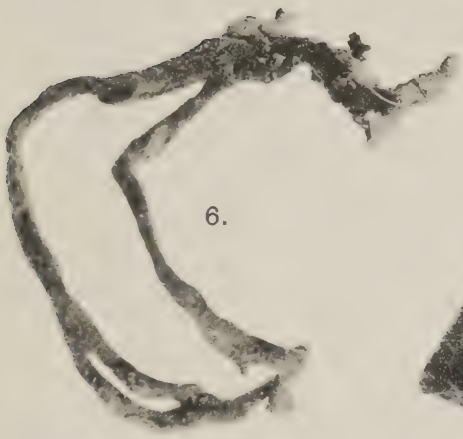

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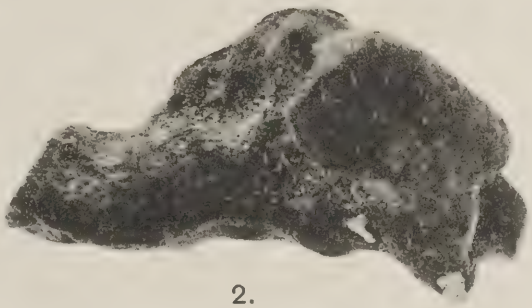

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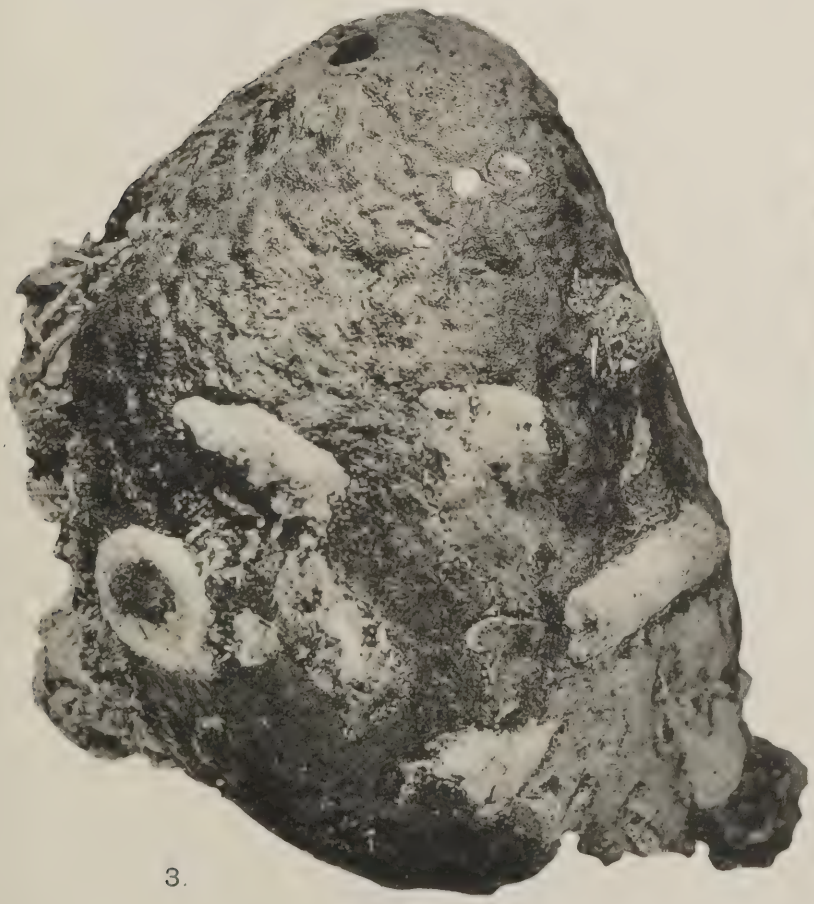

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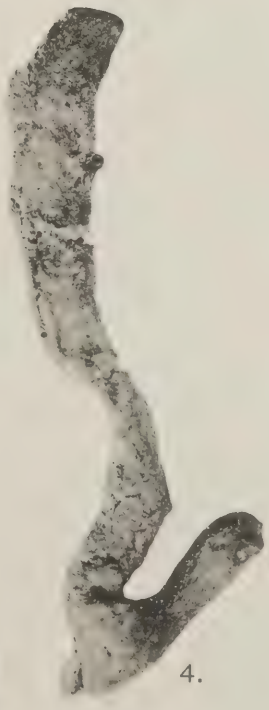

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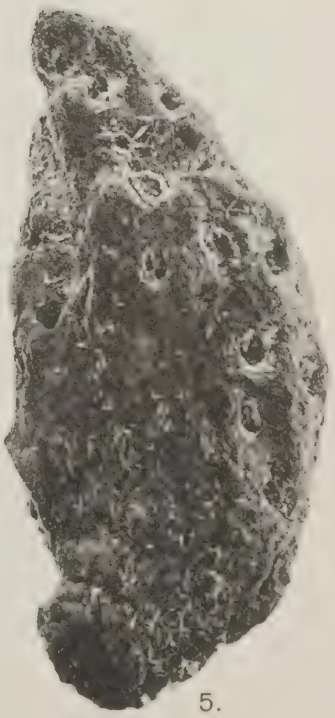

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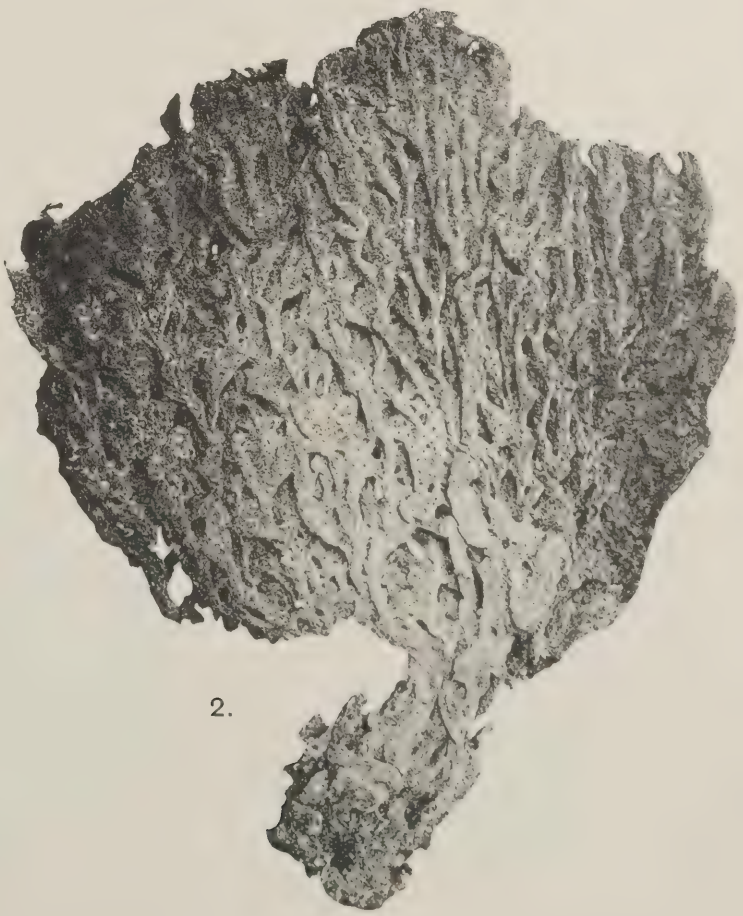

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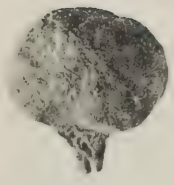

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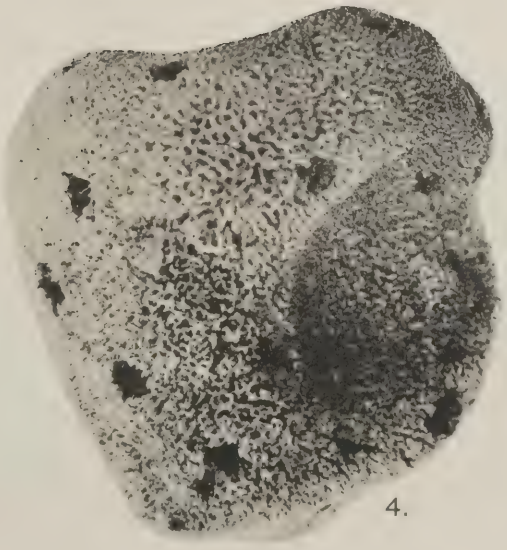

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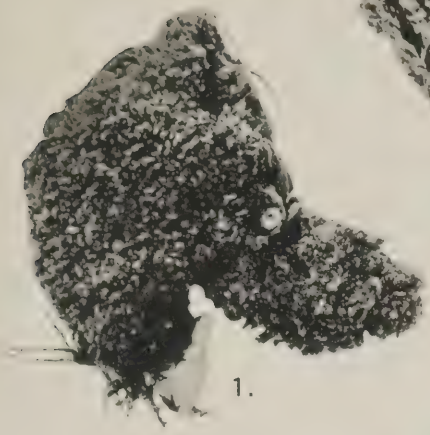

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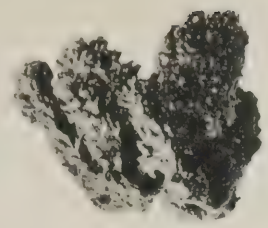

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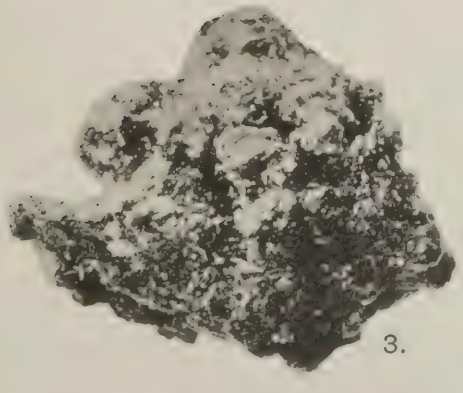

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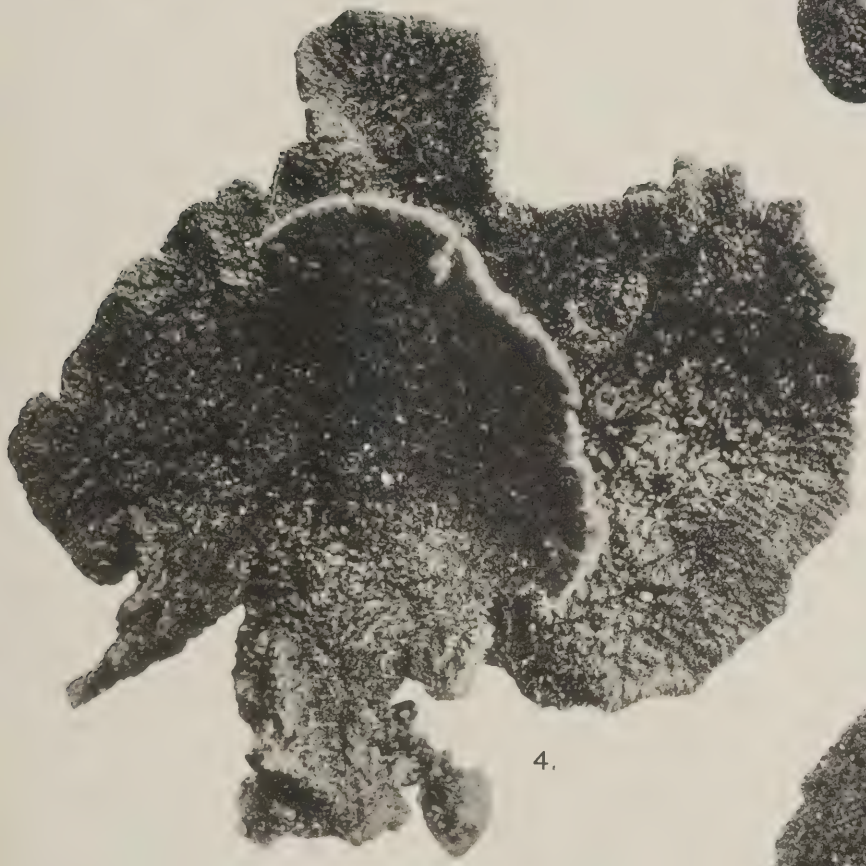

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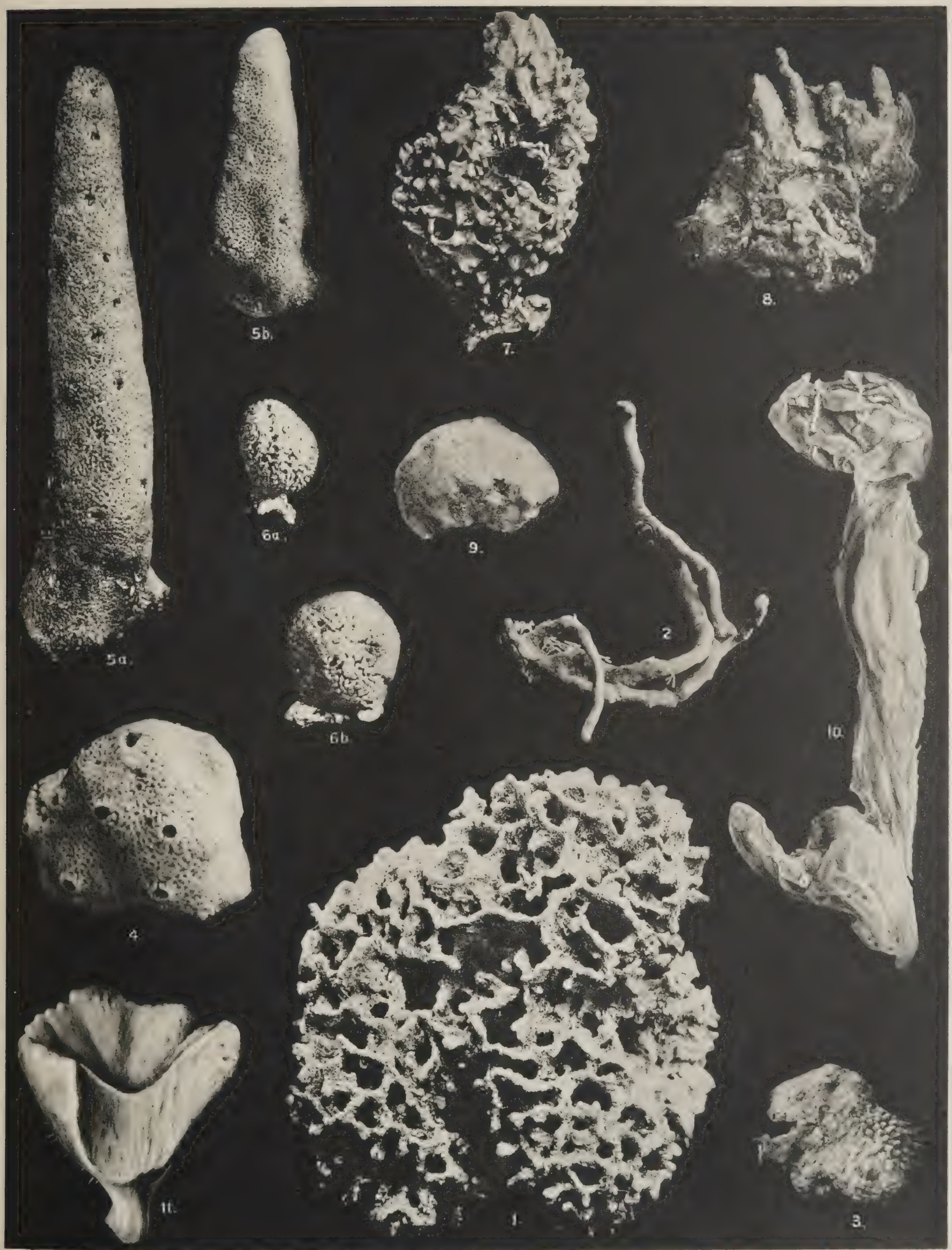

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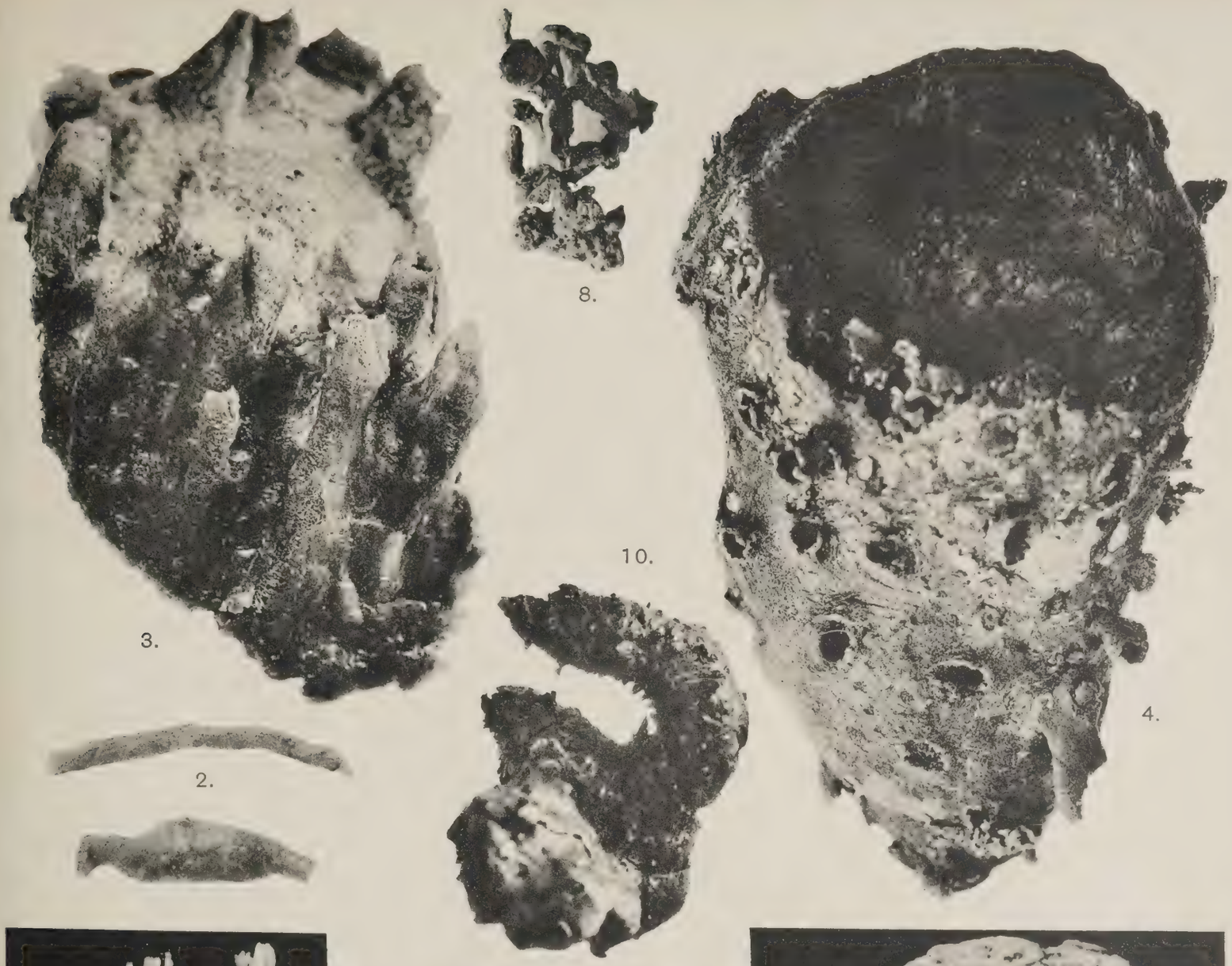
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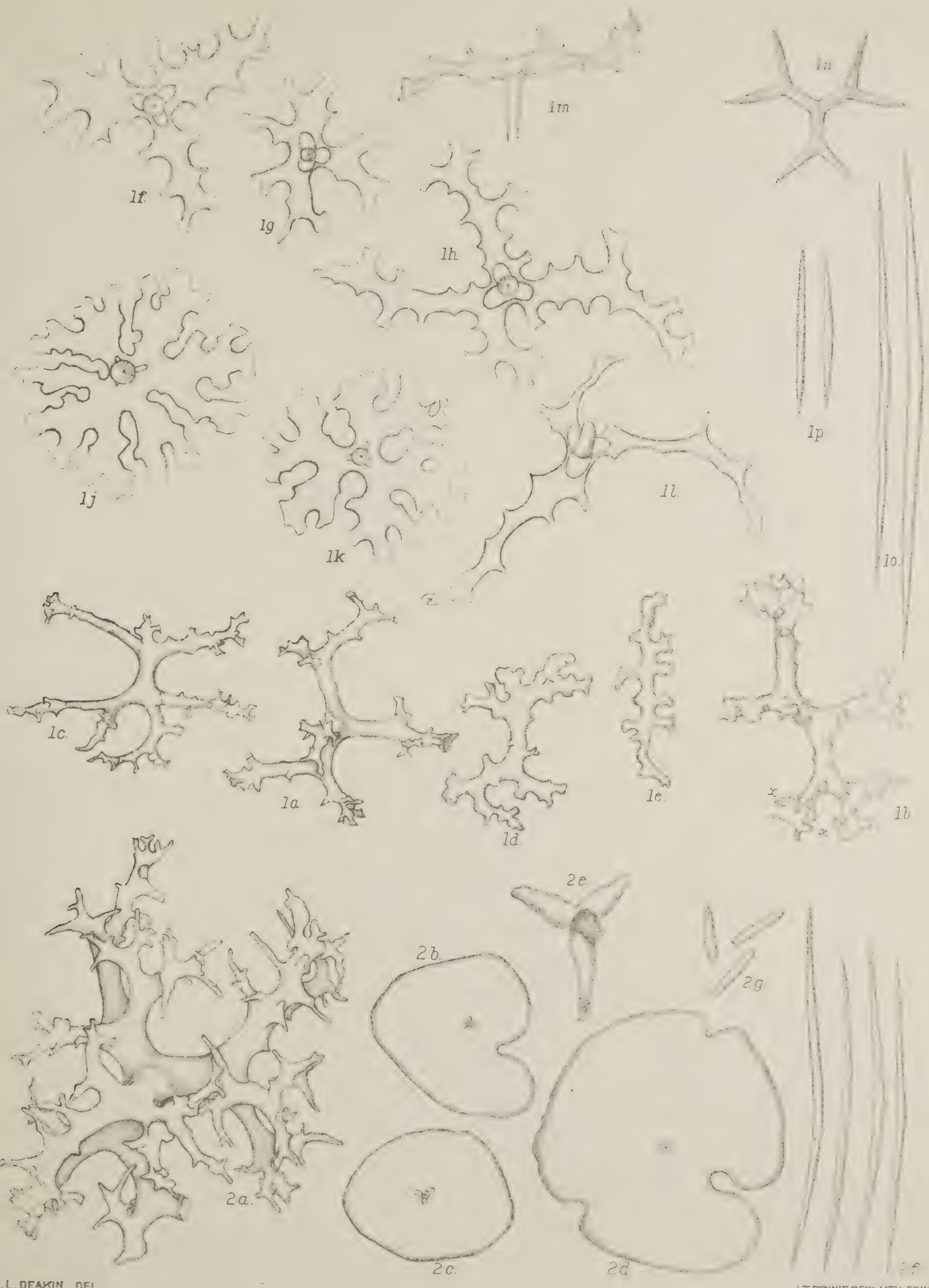

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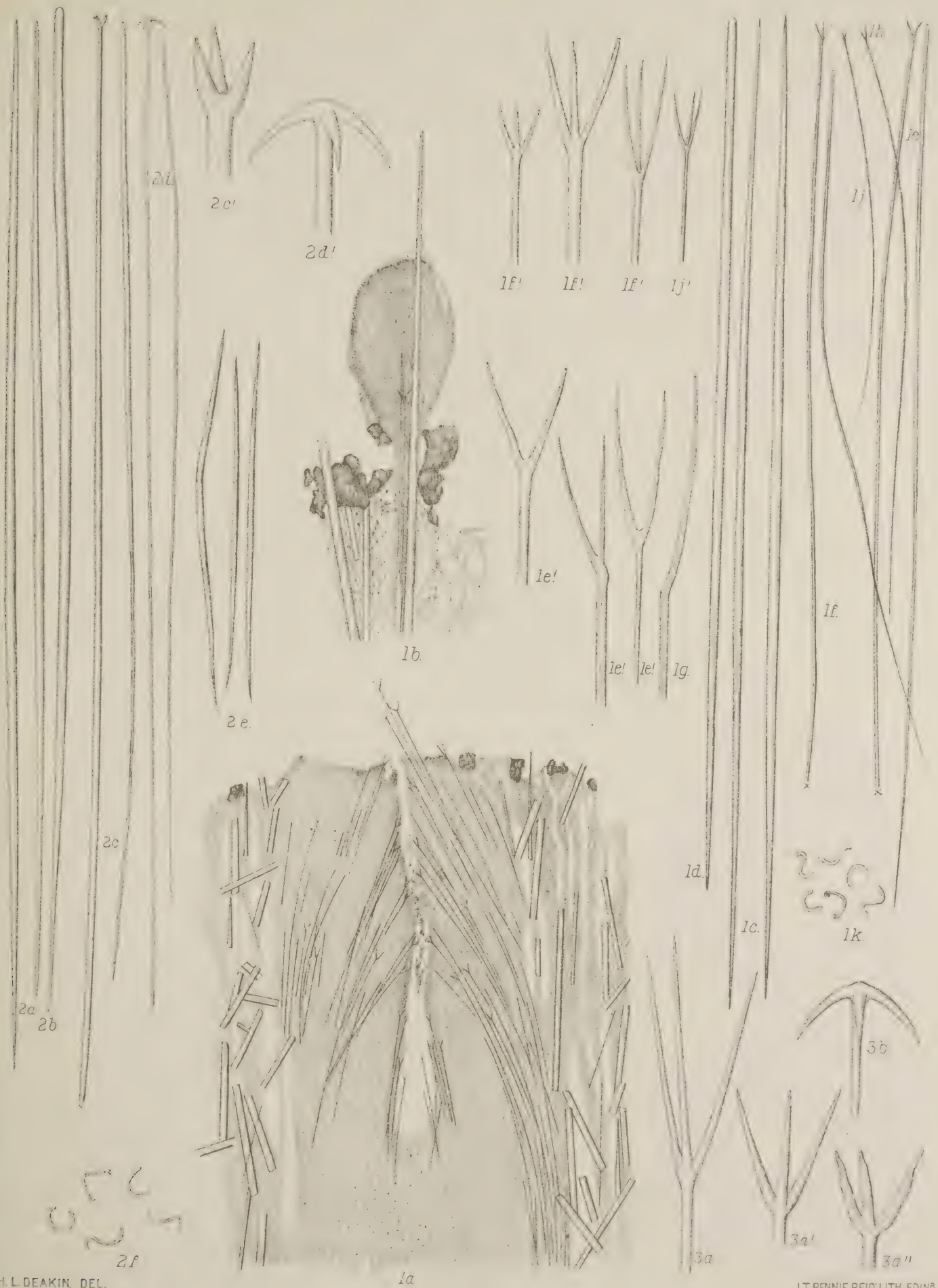
J. T. RENNIE REID, LITH. EDINR

SEALARK TETRAXONIDA.



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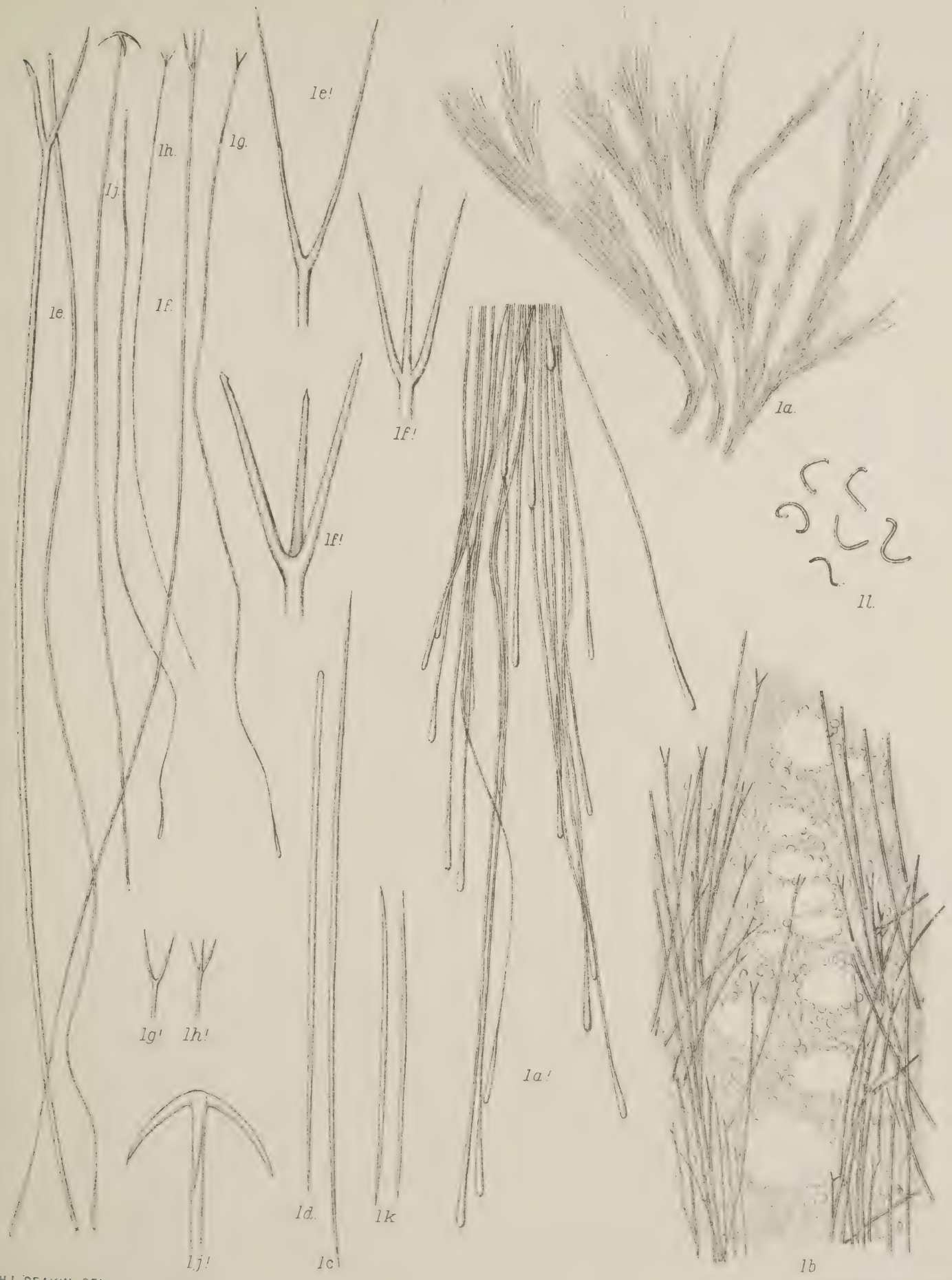

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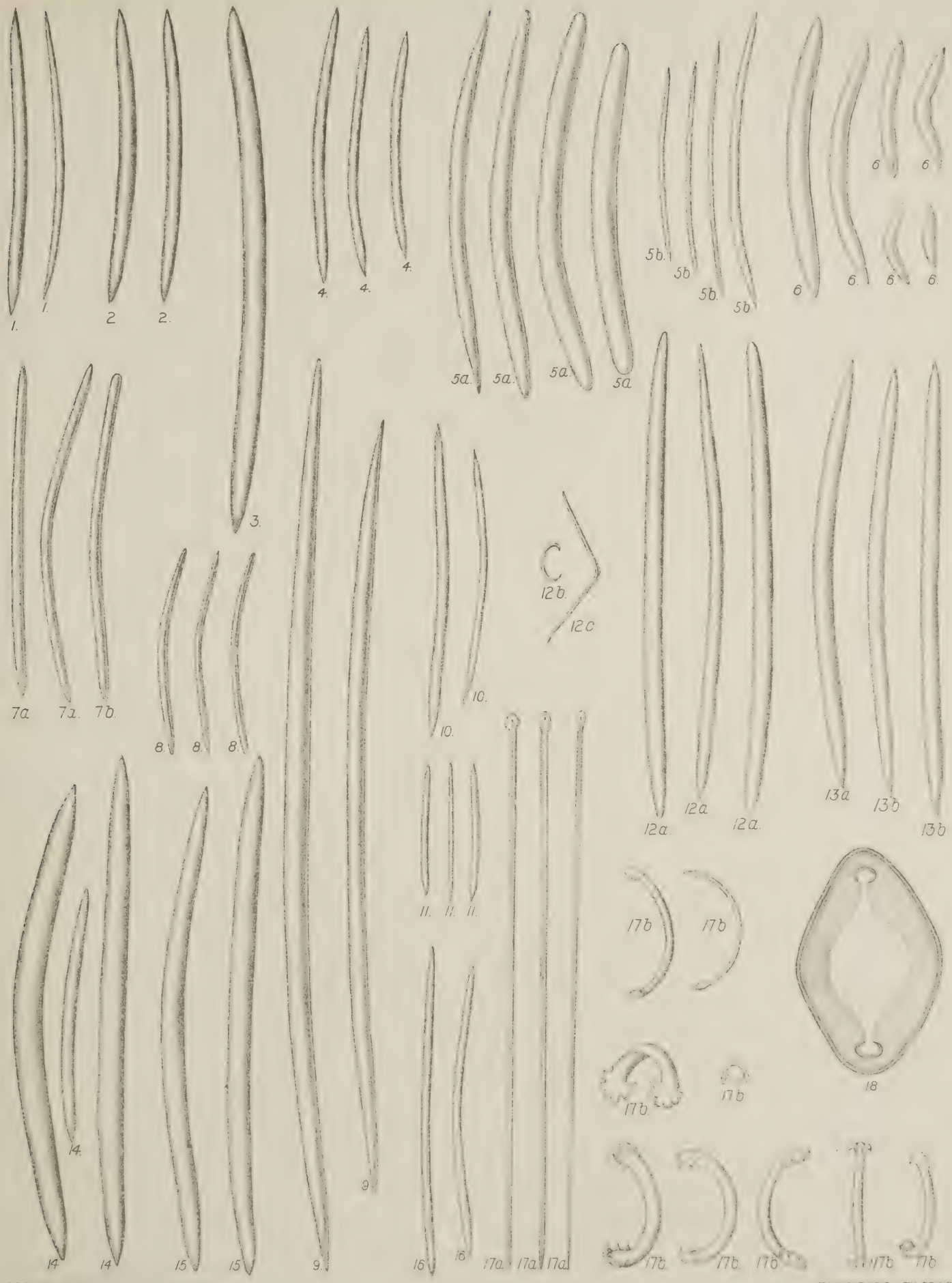

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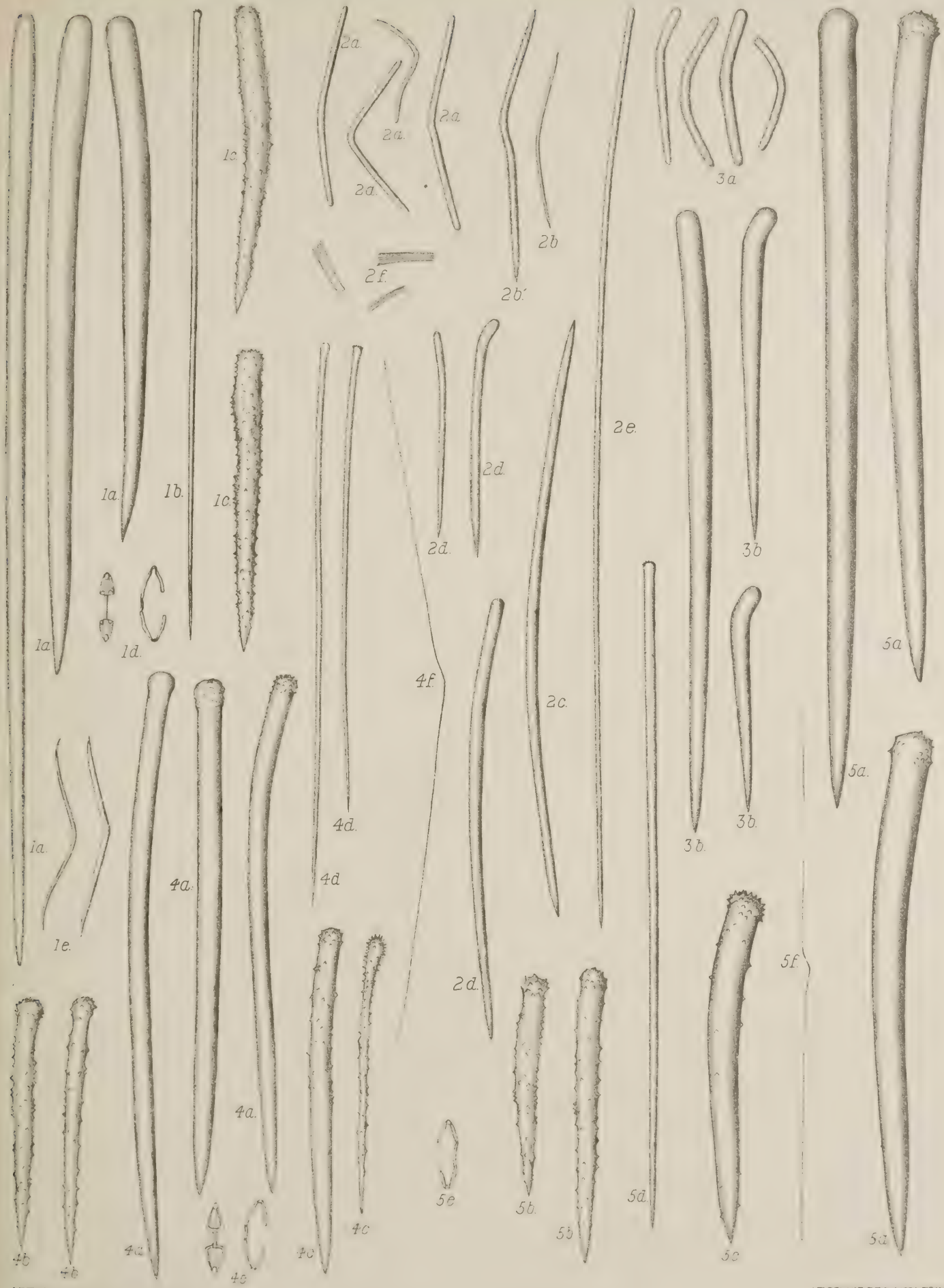

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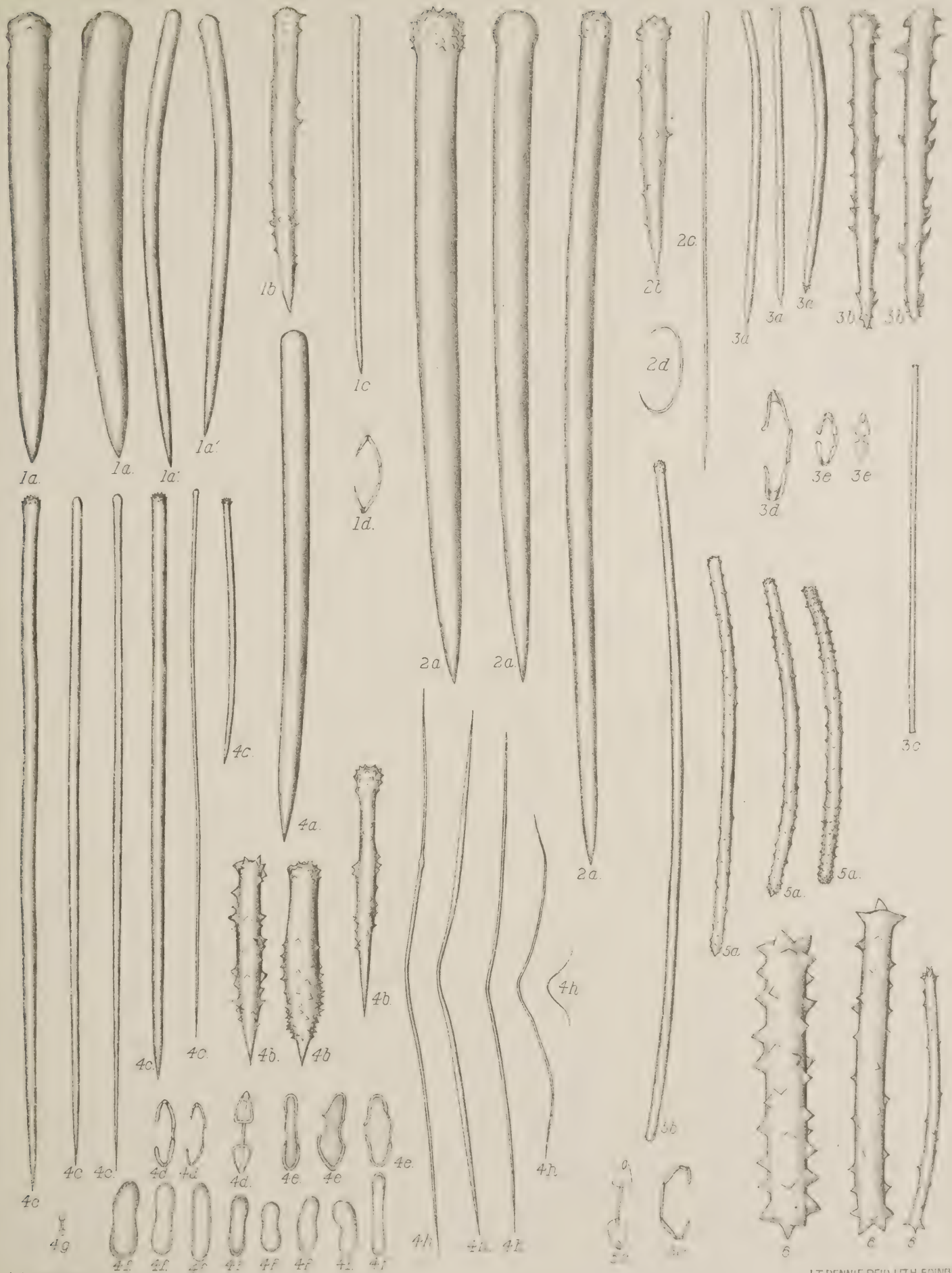
SEALARK TETRAXONIDA.



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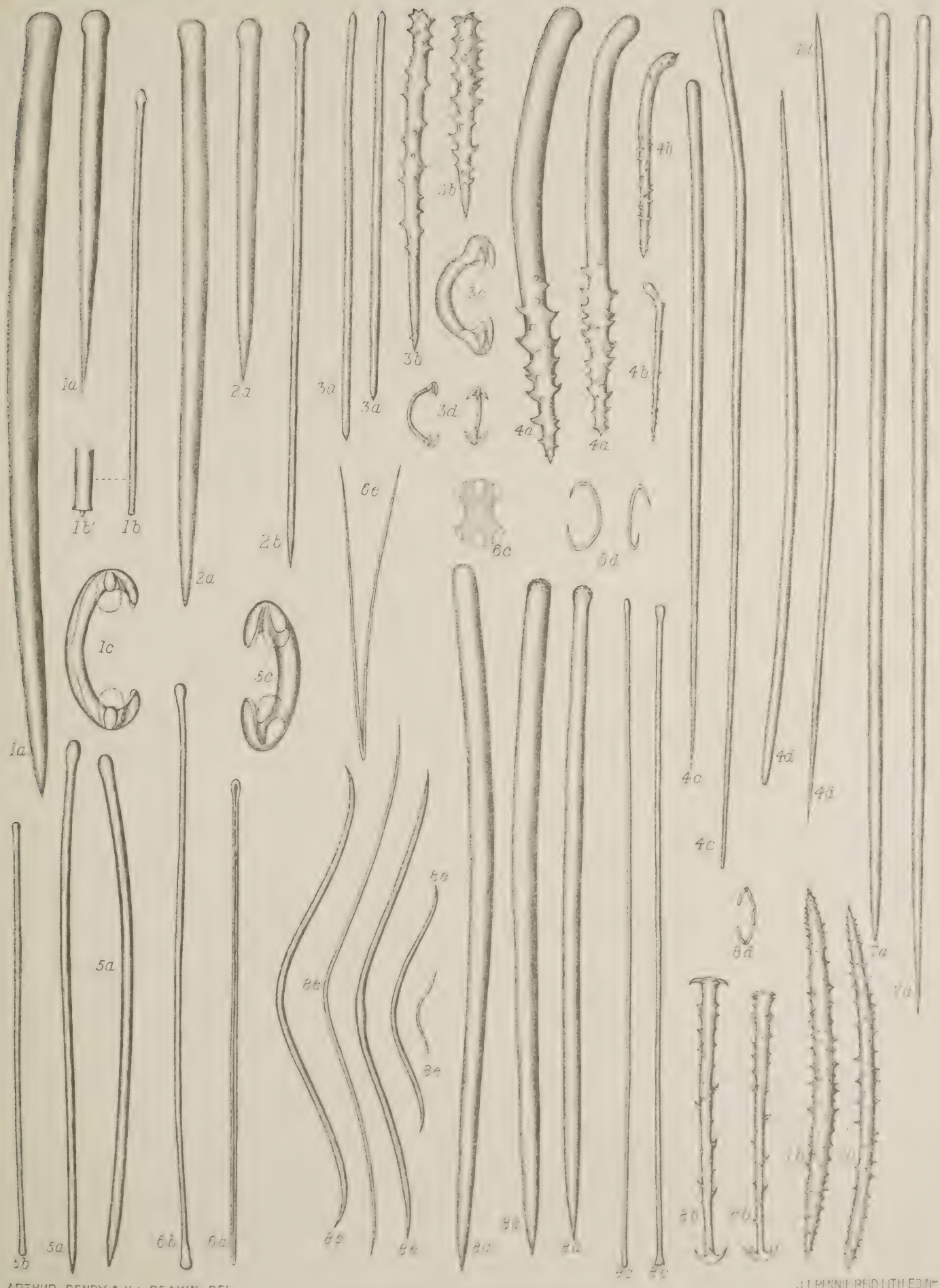
J.T. RENNIE REID, LITH. EDIN.ª

SEALARK TETRAXONIDA.



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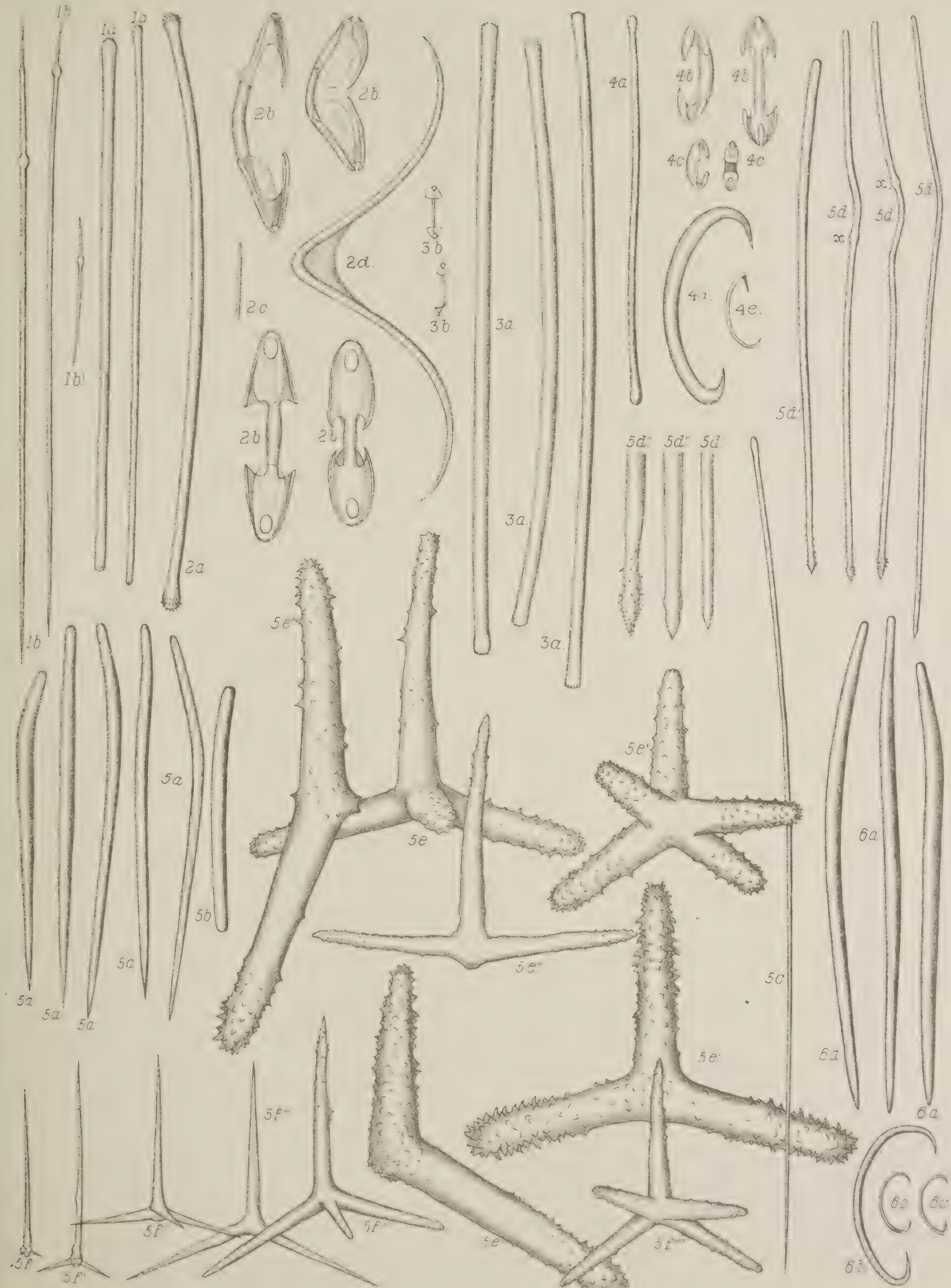

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SEALARK TETRAXONIDA.

5. *Lispinus impressicollis*, Motsch.

38 Exemplare.

Loc. "Seychelles. Silhouette, Mahé, Long Island. Silhouette: Mare aux Cochons, over 1000 ft. Mahé: about 20 taken together near Morne Blanc, about 1000 ft.; Cascade Estate; one specimen was taken from between leaf-bases of a growing *Stevensonia*-palm, in company with *L. specularis*."

Ostindien, Ceylon, Nias-Inseln, Sunda-Inseln, Philippinen, Hong-Kong, Japan, Comoren, Madagaskar, Deutsch-Ostafrika, Hawai, Madeira, Formosa.

6. *Lispinus obscurellus*, Fauvel (*minor*).

Lispinus obscurellus, Fauvel, Rev. d'Ent. (Caen), xxiii. 1904, p. 298.

30 Exemplare.

Loc. "Seychelles. Silhouette, Mahé, Long Island. Silhouette: near Mont Pot-à-eau, ca. 1500 ft., and coconut-planted country at sea-level near Pointe Étienne. Mahé: high forests of Morne Blanc, Trois Frères, and Cascade, 1000—2000 ft. Long Island: near sea-level."

Madagaskar.

7. *Lispinus aequalis*, Fauvel, Ann. Mus. Genova, xii. 1878, p. 205.

1 Exemplar.

Loc. Seychellen. Mahé: Cascade Estate, 800—1000 ft.

Neu-Guinea, Key-Inseln, Engano.

8. *Espeson scotti*, nov. spec.

Ganz von der Gestalt des *Espeson gigantulus* Bernh. vom afrikanischen Festland, jedoch nur halb so gross und in nachfolgenden weiteren Punkten verschieden:

Die Färbung ist lichter, rostrotgelb mit helleren Beinen, der Kopf ist noch weitläufiger und viel stärker punktiert, die Augen sind kleiner, die Schläfen sind deutlich entwickelt. Die Fühler sind viel kürzer, die vorletzten Glieder deutlich quer, das 8. Glied ebenso wie bei gigantulus deutlich kleiner als die einschliessenden.

Der Halsschild ist feiner und weitläufiger punktiert, die Flügeldecken sind kürzer, feiner und etwas weitläufiger punktiert.

Der Hinterleib ist im Gegensatz dazu viel dichter und deutlicher punktiert, zwischen den Punkten deutlich netzartig gewirkt, nur schwach glänzend.

Länge: 3 mm.

Loc. Seychellen. Silhouette: Umgebung von Pot-à-eau, circa 1500 ft., viii. 1908, 1 Exemplar.

9. *Thoracophorus alluaudi*, Fauvel, *op. cit.*, p. 115; Kolbe, *l.c.*

3 Exemplare.

Loc. "Seychelles. Silhouette, Mahé, La Digue. Silhouette: forest near Pot-à-eau and above Mare aux Cochons, 1000—1500 ft. Mahé: Cascade Estate, over 1000 ft. La Digue, 1892 (Alluaud)."

Tribus: **Omaliini.**

10. *Phloeonomus singularis*, Kraatz, Arch. Naturg., xxv. 1859, i. p. 181.

11 Exemplare.

Loc. "Seychelles. Silhouette: high forests, over 1000 ft."

Ceylon.

Tribus: **Oxytelini.**

11. *Trogophloeus* (*Carpalimus*) *palustris*, nov. spec.

Durch kleine, ziemlich breite Gestalt und die doppelten hinter einander liegenden halbmondförmigen Querfurchen auf dem Halsschilde sehr ausgezeichnet.

Schwarz die Fühlerwurzel und die Beine rötlichgelb.

Kopf fast so breit als der Halsschild, mit zwei tiefen, fast parallelen Längsfurchen, fein und nicht sehr dicht punktiert. Augen gross, die Schläfen hinter ihnen jedoch gut entwickelt, fast ein Drittel so lang als der von oben sichtbare Längsdurchmesser der Augen, hinten stumpfeckig vortretend, Fühler ziemlich kurz, die vorletzten Glieder schwach quer.

Halsschild viel schmäler als die Flügeldecken, breiter als lang, an den Seiten gerundet erweitert, vor der Mitte am breitesten, vor dem Hinterrande mit einer längeren, in der Mitte mit einer kürzeren tiefen, nach vorn offenen bogenförmigen Querfurche, vor dem Vorderrande mit einem kleinen Grübchen, ähnlich wie der Kopf, seitlich dichter punktiert, matter.

Flügeldecken mässig länger als der Halsschild, zusammen quer viereckig mit vorstehenden Schulterecken, viel stärker als der Halsschild, nicht zu dicht punktiert, ziemlich glänzend.

Hinterleib sehr fein und nicht allzu dicht punktiert.

Länge: 1·9—2·2 mm.

15 Exemplare.

Loc. Seychellen. Mahé (Morast auf der Ebene zwischen Anse aux Pins und Anse Royale, i. 1909).

Das in Mehrzahl vorliegende Tierchen dürfte mit der ostafrikanischen Fauvel'schen Art *cicyclus* nicht identisch sein, obwohl ich die letztere nur der Beschreibung nach kenne. Die Angaben über die Flügeldeckenlänge sowie über die schlanke Gestalt lassen sich mit der vorliegenden Art wohl nicht vereinen.

12. *Trogophloeus* (*Carpalimus*) *chagosanus*, nov. spec.

In dieselbe Gruppe gehörig wie der vorige, von sehr ähnlicher Gestalt, in der Grösse und Färbung ziemlich übereinstimmend, die Fühlerwurzel und die Schienen jedoch mehr oder minder angedunkelt, durch viel breiteren Kopf, viel grössere Augen, viel längere, feiner und dichter punktierte Flügeldecken und etwas andere Eindrücke auf dem Halsschilde verschieden.

Der Kopf ist fast breiter als der Halsschild, feiner und dichter punktiert, die Augen vorgequollen, fast die ganzen Seiten einnehmend mit sehr kurzen, immerhin aber deutlich angedeuteten Schläfen.

Auf dem Halsschilde ist die mittlere Querfurche in 2 getrennte Eindrücke aufgelöst.

Die Flügeldecken sind viel länger als der Halsschild, fast so lang als breit, viel feiner und dichter punktiert.

Länge: 2—2·3 mm.

18 Exemplare.

Loc. Chagos: Diego Garcia Atoll, 1905.

13. *Bledius marinus*, nov. spec.

Der rotflügeligen Form des *Bl. fracticornis* Payk. in Gestalt, Grösse und Färbung sehr ähnlich, durch ganz gelbrote Fühler sowie durch nachfolgende weitere Merkmale leicht zu unterscheiden.

Der Kopf ist viel breiter, mit den Augen so breit als die Flügeldecken, vor den Augen zwischen den Fühlerhöckerchen mit einer geraden scharfen Querfurche, am Scheitel mit einem tiefen Grübchen, welches sich seitwärts in eine Querfurche fortsetzt, hinten neben den Augen deutlich und ziemlich dicht punktiert.

Der Halsschild ist viel länger, nur wenig breiter als lang, an den Seiten länger parallel, viel weniger tief und weniger scharf, deutlich runzelig punktiert.

Flügeldecken etwas kürzer, weniger scharf und weniger tief, stellenweise in einander fliessend punktiert.

Länge: 4—5 mm.

Loc. Aldabra: Takamaka, xi.—xii. 1908 (Fryer), 3 Exemplare.

Tribus: **Osoriini**.

14. *Paragonus insularis*, nov. spec.

Von den übrigen bekannten Arten schon durch den glänzenden, weitläufig punktierten Körper leicht zu unterscheiden.

Rostfarben mit helleren Fühlern, Tastern und Beinen.

Kopf viel schmäler als der Halsschild, ober den Fühlerhöckerchen mit einem Grübchen sonst ohne Eindrücke, fein und weitläufig, langs der Mitte sehr fein und spärlich punktiert, stark glänzend. Fühler gedrungen, ihr zweites und drittes Glied ziemlich gleich, oblong, das 4. kugelig, die folgenden quer, allmählich an Breite zunehmend, die vorletzten ziemlich stark quer, das letzte etwas länger als das vorletzte. Halsschild fast so breit als die Flügeldecken, viel mehr als doppelt so breit als lang, an den Seiten sanftgerundet, im letzten Drittel am breitesten, nach vorn schwach, nach rückwärts plötzlich und stark schräg verengt mit stumpf angedeuteten Hinterecken, vor diesen mit einem grossen tiefen Grübchen, vor dem Hinterrande mit einem Quereindruck, hinter dem Vorderrande jederseits der Mitte mit einem schwächeren Eindrucke, weitläufig, gegen die schwach gezähnelten Seiten zu deutlich körnig, gegen die Mitte zu einfach und allmählich feiner punktiert, ziemlich stark glänzend.

Flügeldecken etwas länger als der Halsschild, zusammen stark quer, mässig fein und weitläufig, ziemlich flach punktiert, zwischen den Punkten chagriniert, mässig glänzend.

Hinterleib fein und nicht dicht punktiert.

Länge: 2 mm.

Loc. Seychellen. Praslin: Côtes d'Or Estate, xi. 1908, 1 Exemplar.

15. *Mimogonus fumator*, Fauvel.

Loc. Seychellen. Félicité Island, xii. 1908, 1 Exemplar.

Sunda-Inseln, Himalaya (Sikkim), Neu-Kaledonien, Madagaskar, Ostafrika, Guadeloupe, Mexiko.

16. *Osorius sechellarum*, Kolbe, *op. cit.*, p. 20.

8 Exemplare.

Loc. "Seychelles: Silhouette, Mahé. Silhouette: high forest above Mare aux Cochons, 1000—2000 ft., from fallen and rotting tree-trunks, 5 specimens. Mahé: 2 examples from high forest near Morne Blanc, one being taken from between leaf-bases of a growing *Stevensonia*-palm; and 1 specimen from Cascade Estate, about 1000 ft."

Tribus: **Stenini.**

17. *Stenus silvicola*, nov. spec.

Diese Art steht jedenfalls dem mir nur nach der Beschreibung bekannten *Stenus delphinus* Fauv. von Madagaskar sehr nahe und wurde zuerst von mir für diese Art gehalten.

Ein genauer Vergleich mit der Beschreibung *Fauvels* führte mich jedoch zu dem Schlusse, dass wir es hier doch mit einer eigenen Art zu tun haben, da die Punktierung namentlich des Halsschildes und des Hinterleibes wesentlich von der Beschreibung abweicht.

Der Halsschild ist auf den herabgebogenen Seiten wohl dicht, aber kräftig, oben feiner aber dafür nicht dicht punktiert, überdies ist eine schmale Mittellinie ziemlich geglättet.

Der Hinterleib ist oben kaum sichtbar und nur ganz vereinzelt punktiert.

Die Flügeldecken sind nicht "sat subtiliter" sondern ziemlich stark, nach rückwärts viel feiner und weitläufiger, vor dem Hinterrande nur vereinzelt punktiert; sie sind auch nicht ganz doppelt so breit als der Halsschild.

Endlich sind die Fühler eher kürzer als länger wie der Halsschild und Kopf zusammengenommen.

Der vordere Teil des Kopfes ist dicht silberweiss behaart.

Länge: 5—6 mm.

Beim ♂ ist das 6. Sternit etwas vorgezogen und breit und flachbogig ausgeschnitten.

57 Exemplare.

Loc. "Seychelles. Silhouette, Mahé. Beaten from dicotyledonous trees and bushes (not from palms) in the mountain-forests. Silhouette: near Pot-à-eau, about 1500 ft. Mahé: country above Port Glaud, 500—1000 ft.; forests of Morne Blanc, Trois Frères, Mare aux Cochons, and Cascade, 1000—2000 ft."

Tribus: **Euaesthetini.**

18. *Edaphus africanus*, Epp.

Diese aus West-Afrika und Abessinien bekannte Art dürfte wohl sicher mit den vorliegenden Stücken identisch sein, wenigstens passt auf sie die Beschreibung sehr gut.

Loc. "Seychelles: Silhouette, Mahé. Silhouette: one example from near Pot-à-eau, about 1500 ft.; and one from between leaf-bases of a growing *Stevensonia*-palm, above Mare aux Cochons. Mahé: Cascade Estate, one specimen."

19. *Edaphus spectabilis*, nov. spec.

Der vorigen Art sehr nahe stehend, doppelt so gross und überdies durch die Kopfauszeichnung leicht kenntlich.

Dieser besitzt zwischen den Augen ebenfalls eine scharfe Querfurche, an Stelle der

kurzen, neben einander stehenden grübchenartigen kurzen Längsfurchen besitzt der Kopf bei der neuen Art zwei lange, scharfe nach vorn konvergierende und sich winkelig treffende Längsfurchen, deren Zwischenraum glatt und flach gewölbt ist.

Ausserdem ist der Halsschild etwas länger, nach vorn weniger verengt und besitzt deutliche rechteckige Vorderecken, während sie bei *africanus* fast ganz verrundet sind.

Sonstige greifbare Unterschiede konnte ich nicht feststellen.

Länge: 1·8 mm.

2 Exemplare.

Loc. Seychellen. Praslin: Côtes d'Or Estate, xi. 1908. Silhouette: Mare aux Cochons, ix. 1908.

20. *Edaphus sechellarum*, nov. spec.

Eine winzige Art aus der Nähe des *africanus* Epp. jedoch kaum halb so gross, durch viel schlankere, schmälere Gestalt, längeren, schmäleren Halsschild und viel längere Flügeldecken sofort zu unterscheiden.

Der Kopf besitzt rückwärts eine scharfe Querfurche, vor welcher zwei grosse, längliche Grübchen eingestochen sind.

Der Halsschild ist fast länger als breit, hinten ausgeschweift verengt, vor der Wurzel mit vier grossen und tiefen Grübchen.

Die Flügeldecken sind viel breiter und viel länger als der Halsschild, oblong, sowie der übrige Körper ohne erkennbare Punktierung, stark glänzend.

Länge: $\frac{3}{4}$ mm.

Loc. "Seychelles: Silhouette, Mahé. Silhouette: two specimens from high forest above Mare aux Cochons, one being from the decayed head of a felled *Verschaffeltia*-palm. Mahé: near Morne Blanc, one example."

Tribus: **Pinophilini**.

21. *Palaminus pennifer*, Fauv.

Diese Art hat eine weite Verbreitung. Ich besitze Stücke von den Philippinen u. Singapore. Nach Fauvel kommt die Art auf Madagaskar und Java vor. Die vorliegenden zahlreichen Stücke von den Seychellen unterscheiden sich in keinem Punkte von den übrigen.

76 Exemplare.

Loc. "Seychelles: Silhouette, Mahé. Generally distributed through the endemic forests of both islands, from 1000 ft. or less, to some of the highest summits, over 2000 ft."

Tribus: **Paederini**.

22. *Astenus scotti*, nov. spec.

Eine höchst ausgezeichnete kurzflügelige Art, die durch die Färbung des ausgereiften Tieres und die kurzen und dabei sehr schmalen und gestreckten Flügeldecken und deren Beborstung leicht kenntlich ist.

Hell rötlichgelb, Fühler und Beine weisslichgelb, die Kopfseiten, die Flügeldecken an der Wurzel mehr oder minder ausgedehnt angedunkelt, der vorletzte Hinterleibsring schwärzlich.

Schmal, langgestreckt, flügellos, am 7. Tergit ohne weissen Hautsaum, ziemlich matt.

Kopf mit den Augen etwas breiter als der Halsschild, langgestreckt, um mehr als die Hälfte länger als breit mit sehr flachen, überaus grossen, undeutlichen Nabelpunkten nicht sehr dicht besetzt, die Augen in der Mitte der Kopfseiten gelegen, diese vor ihnen gleichbreit, hinter ihnen sanft gerundet, die Schläfen fast doppelt so lang als der Längsdurchmesser der Augen. Fühler gestreckt, dünn, die Glieder mit Ausnahme des zweiten etwas kürzeren mindestens dreimal so lang als breit.

Halsschild viel breiter als die Flügeldecken, ungefähr um die Hälfte länger als breit, vor der Mitte am breitesten, nach rückwärts geradlinig und ziemlich stark verengt, nach vorn fast noch stärker, jedoch in ziemlich kurzem Bogen verengt, längs der Mitte mit einer tiefen und starken, nach vorn schwächer werdenden verkürzten Furche, zu beiden Seiten mit je einem schwächeren schiefen Längseindruck, ähnlich wie der Kopf punktiert, an den Seiten mit vier längeren und vorn mit einer kurzen Borste.

Flügeldecken viel kürzer und schmäler als der Halsschild, fast doppelt so lang als zusammen breit, sehr schmal, gegen die Wurzel verschmälert, ziemlich kräftig und weitläufig, unregelmässig gekörnt, an den geradlinigen Seiten mit einer grösseren Anzahl starker, starrer, nadelförmiger schwarzer Borsten.

Hinterleib nach rückwärts etwas erweitert, mässig stark und mässig dicht punktiert, glänzender als der übrige Körper.

Länge: 4·2—5 mm.

17 Exemplare.

Loc. "Seychelles: Silhouette, Mahé. Beaten from trees (not palms) in the mountain-forests. Silhouette: near Mont Pot-à-eau and Mare aux Cochons, ca. 1000—1500 ft. Mahé: Cascade Estate, ca. 1000 ft."

23. *Astenus depressipennis*, nov. spec.

Ebenfalls ungeflügelt, von dem vorherigen durch viel kürzere, weniger schlanke Gestalt, andere Färbung, viel kürzere Bildung der einzelnen Körperteile und andere Punktierung, sowie den Mangel der eigentümlichen Beborstung auf den ersten Blick zu unterscheiden.

Rotgelb mit weisslichen Beinen, Fühlern und Tastern und schwarzen Augen.

Kopf etwas breiter als der Halsschild, nur mässig länger als breit, hinten viel stärker gerundet als bei der vorigen Art, mit grossen, deutlichen Nabelpunkten dicht besetzt. Fühler sehr dünn und lang, die vorletzten Glieder dreimal so lang als breit.

Halsschild breiter als die Flügeldecken, um ein Viertel länger als breit, knapp vor der Mitte stark bogig erweitert, nach rückwärts ziemlich gerade, nach vorn stärker und in sanftem Bogen verengt, dicht, mit scharfen Nabelpunkten besetzt, ohne deutliche Eindrücke.

Flügeldecken kürzer als der Halsschild, nach rückwärts stark erweitert, mässig länger als hinten breit, kräftig, einfach, scharf und ziemlich dicht punktiert.

Hinterleib nach rückwärts erweitert, mässig stark und mässig dicht punktiert.

Länge: 3—3·5 mm.

Loc. Seychellen. Mahé: Hochwald am Gipfel von Pilot, 2000 ft., x.—xi. 1908; Morne Seychellois, 1500—2000 ft., ii. 1909: 3 Exemplare.

24. *Astenus melanarius*, Küst.

Loc. Seychellen. Silhouette, 1908.

Das einzige, etwas schlecht erhaltene Stück kann ich von der im Mittelmeergebiet vorkommenden Küsterschen Art nicht unterscheiden.

25. *Astenus neglectus*, Märkel, var. ?

Loc. Seychellen: Long Island ("beach just above high-water mark, one example, vii. 1908").

A. neglectus ist von Mitteleuropa bekannt.

26. *Stilicus ceylanensis*, Kraatz.

Loc. Seychellen. Mahé: Morne Blanc, x. 1908, 1 Exemplar.

Ceylon, Borneo, Java, Philippinen, Singapore, Japan.

27. *Medon debilicornis*, Woll.

18 Exemplare.

Loc. "Seychelles. Silhouette, Mahé, Long Island, Praslin. Silhouette: Mare aux Cochons, ca. 1000 ft. Mahé: high forests of Morne Blanc, Cascade and Mare aux Cochons district, 1000—2000 ft. Praslin: Côtes d'Or Estate."

Fast über die ganze Erde verbreitet.

28. *Medon testaceorufus*, nov. spec.

Die neue Art steht dem *debilicornis* Woll. ungemein nahe, besitzt dieselbe Gestalt, Grösse und Färbung, die letztere hat jedoch einen stärkeren Stich ins rötliche. Die Flügeldecken sind kürzer, nur wenig länger als der Halsschild. Sehr auffallend ist der Unterschied in der Punktierung. Der Kopf und der Halsschild sind nämlich stärker, tiefer und dadurch schärfer und mindestens doppelt so dicht punktiert, als bei *debilicornis*. Von dieser Punktierung hebt sich die glänzend glatte, unpunktierte ziemlich breite Mittellinie scharf hervor. Neben dieser ist ein länglicher Eindruck deutlich sichtbar.

Die Flügeldecken sind ebenfalls deutlich dichter punktiert, zusammen so breit als lang.

Am Hinterleib treten deutliche Unterschiede nicht hervor.

Länge: 2—2·2 mm.

Loc. "Seychelles. Long Island: beach just above high-water mark, vii. 1908, three specimens."

29. *Medon trapeziformis*, nov. spec.

Eine durch die kurze, breite Gestalt und den trapezförmigen, nach rückwärts stark erweiterten Kopf ausgezeichnete Art.

Heller oder dunkler rötlichgelb, die Flügeldecken mehr oder weniger angedunkelt, die Beine, Fühler und Taster heller rötlichgelb.

Kopf hinten etwas breiter als der Halsschild, nach vorn deutlich verengt, die Hinterecken ziemlich schmal verrundet, um ein gutes Stück breiter als lang, mässig stark und ziemlich dicht punktiert, etwas glänzend, längs der Mitte nur mit sehr schwacher Andeutung einer geglätteten Mittellinie. Fühler gedrungen, die vorletzten Glieder ziemlich stark quer.

Halsschild nur wenig schmäler als die Flügeldecken, fast um die Hälfte breiter als lang,

verkehrt trapezförmig, ähnlich wie der Kopf, jedoch etwas feiner und weitläufiger punktiert, etwas stärker glänzend.

Flügeldecken um ein Drittel länger als der Halsschild, mässig fein und mässig dicht punktiert, ziemlich glänzend.

Hinterleib äusserst fein und äusserst dicht behaart, matt, grauseidig behaart.

Länge: 3 mm.

3 Exemplare.

Loc. Seychellen. Silhouette, Mahé, Praslin. Silhouette: Mont Pot-à-eau, 1500 ft. Mahé: Cascade Estate, ca. 1000 ft. Praslin: Côtes d'Or Estate.

30. *Medon variipennis*, nov. spec.

Eine glänzende, durch die Färbung und die Punktierung charakterische Art.

Kopf und Halsschild rostrot, die Flügeldecken rötlichgelb mit einer breiten schwarzen Querbinde über die Mitte, Hinterbrust und Hinterleib schwarz, die Spitze des letzteren rötlich, die Fühler und Taster rostgelb, die Beine hell rötlichgelb.

Kopf deutlich breiter als der Halsschild, etwas breiter als lang, nach rückwärts unmerklich erweitert, mit kurz verrundeten in der Anlage rechtwinkeligen Hinterecken, mässig stark und dicht, gegen die Mitte zu und besonders vorn viel spärlicher und feiner punktiert, längs der Mittellinie schmal geglättet, ziemlich glänzend. Fühler ziemlich dick, die vorletzten Glieder mässig quer.

Halsschild um ein gutes Stück schmäler als die Flügeldecken, nur wenig breiter als lang, im ersten Fünftel am breitesten, nach rückwärts fast geradlinig und ziemlich stark verengt, vor der Mitte sehr schwach eingebuchtet, glänzend, sehr fein und sehr weitläufig punktiert, mit deutlicher, geglätteter Mittellinie.

Flügeldecken viel länger als der Halsschild, länger als zusammen breit, länglich rechteckig, fein und weitläufig punktiert, glänzend.

Hinterleib mässig fein und ziemlich dicht punktiert, mässig glänzend.

Länge: etwas über 3 mm.

2 Exemplare.

Loc. Seychellen. Mahé: Hochwald, Morne Blanc, 24. x. 1908; Morne Seychellois, 1500—2000 ft., ii. 1909. Silhouette: Pot-à-eau, viii. 1908.

31. *Medon testaceomarginatus*, nov. spec.

Durch die Färbung, ziemlich gewolbten, glänzenden Körper und die Geschlechtsauszeichnung des ♂ recht ausgezeichnet und mit keiner anderen mir bekannten Art zu verwechseln.

Tiefschwarz, glänzend, die Flügeldecken mit breitem gelbem Hinterrande, die Hinterleibsspitze rötlich, die Fühler, der Mund und die Beine dunkel rostrot. Bei unreifen Tieren wird die schwarze Färbung braunrot bis rötlich.

Kopf beim ♂ breiter, beim ♀ so breit als der Halsschild, etwas breiter als lang, viereckig, vor dem Halse mit kurzer tief eingegrabener Mittelfurche, kräftig und ziemlich seicht, in der Mitte etwas weitläufiger punktiert. Fühler kurz, die vorletzten Glieder sehr stark quer.

Halsschild schmäler als die Flügeldecken, deutlich quer, nach rückwärts geradlinig verengt, ähnlich wie der Kopf, jedoch etwas weitlaüfiger punktiert, auf der hinteren Hälfte mit kurzer geglätteter Mittellinie, glänzend.

Flügeldecken um ein gutes Stück länger als der Halsschild, zusammen kaum länger als breit, wenig kräftig und wenig dicht punktiert, glänzend. Der Vorderrand der gelben Hinterrandborte ist gerade abgeschnitten.

Hinterleib mässig fein und nicht allzu dicht punktiert.

Länge: 3·2—4 mm.

Beim ♂ ist das 6. Sternit ziemlich schmal und ziemlich tief bogig ausgeschnitten.

32 Exemplare.

Loc. "Seychelles: Silhouette, Mahé, Praslin. Silhouette: high forest near Mont Pot-à-eau and above Mare aux Cochons, including seven specimens taken from between leaf-bases of a growing *Stevensonia*-palm at about 2000 ft., and one taken from another *Stevensonia* at about 1500 feet. Mahé: high forests of Morne Blanc, Trois Frères, and Cascade, including two examples taken from leaf-bases of a growing *Stevensonia*. Praslin: two examples from leaf-bases of growing *Pandanus*, Côtes d'Or Estate."

32. *Medon cephalotes*, nov. spec.

Von der breiten und flachen Gestalt des *Medon planus* Kraatz und *planatus* Bernh. und ihnen nahe verwandt, durch viel kürzeren Halsschild und kürzere, weniger dicht punktierte Flügeldecken sofort zu unterscheiden.

Heller oder dunkler rötlichbraun bis pechbraun mit rostroten Fühlern, Tastern und Beinen.

Kopf beim ♂ viel breiter, beim ♀ kaum breiter als der Halsschild, deutlich breiter als lang, nach rückwärts etwas bauchig erweitert mit verrundeten, in der Anlage spitz- bis rechteckigen Hinterwinkeln, längs der Mitte schmal geglättet, sonst sehr fein und sehr dicht punktiert, wenig glänzend. Fühler mässig kurz, die vorletzten Glieder nur schwach quer.

Halsschild etwas schmäler als die Flügeldecken, ziemlich stark quer, nach rückwärts geradlinig und mässig stark verengt, mit verrundeten Hinterwinkeln und stumpfen Vorderecken, am Vorder- und Hinterrande gerundet, längs der Mitte schmal geglättet, sehr fein und ziemlich dicht punktiert, wenig glänzend.

Flügeldecken länger als der Halsschild, zusammen wenig länger als breit, fein und mässig dicht punktiert, mässig glänzend.

Hinterleib sehr fein und sehr dicht punktiert, matt.

Länge: 2·7—3 mm.

Beim ♂ ist das 6. Sternit flach ausgerandet.

21 Exemplare.

Loc. "Seychelles: Silhouette, Mahé, Praslin. Silhouette: high forests, including two specimens from between leaf-bases of a growing *Pandanus hornei*, and one from leaf-bases of a palm. Mahé: high forest of Morne Blanc; Cascade Estate, one example from leaf-bases of a *Stevensonia*. Praslin: forest on Côtes d'Or Estate, one specimen being from between leaf-bases of a growing Coco-de-Mer (*Lodoicea*)."

33. *Medon nigripennis*, nov. spec.

In die nächste Nähe der vorigen Art zu stellen, von derselben niedergedrückten Gestalt, jedoch auf den ersten Blick durch die auffällige Färbung, viel längeren Kopf, Halsschild, längere Flügeldecken und dichtere Punktierung zu unterscheiden.

Matt gelbrot, die Flügeldecken schwarz, die Fühler, Taster und Beine rötlichgelb.

Kopf breiter als der Halsschild, beim ♂ viel breiter als beim ♀, fast so lang als breit, nach rückwärts deutlich erweitert, vorn beim ♂ mit einem deutlichen Eindruck, hinten mit äusserst schmaler, glänzender Mittellinie, fein und sehr dicht punktiert. Fühler kurz, ihre vorletzten Glieder stark quer.

Halsschild deutlich schmäler als die Flügeldecken, fast länger als breit, nach rückwärts schwach verengt, ähnlich wie der Kopf, aber etwas weniger dicht punktiert, hinten mit äusserst feiner, kaum sichtbarer Längsfurche.

Flügeldecken viel länger als der Halsschild, zusammen viel länger als breit, viel stärker als der letztere, sehr dicht und rauh punktiert, matt.

Hinterleib sehr fein und sehr dicht punktiert.

Länge: fast 3 mm.

Ob Geschlechtsauszeichnungen des ♂ bestehen, kann ich bei der Art der Praeparation der vorliegenden Stücke nicht ersehen.

4 Exemplare.

Loc. Seychellen. Mahé: Cascade Estate, 1000 ft., iii. 1909. Silhouette: Pot-à-eau, viii. 1908; Mare aux Cochons, ix. 1908.

34. *Medon strigosus*, nov. spec.

Im Allgemeinen von der Körpergestalt des *Medon fortepunctatus* Bernh., etwas kleiner, durch die dichte längsrissige Punktierung des Halsschildes sofort zu erkennen.

Pech- bis rotbraun, die letzten Fühlerglieder und die Schienen und Tarsen heller.

Kopf deutlich schmäler als der Halsschild, quer, hinter den Augen gleichbreit, kräftig, und äusserst dicht, gleichmässig punktiert, matt. Fühler ziemlich gestreckt, gegen die Spitze nicht verdickt, die vorletzten Glieder kaum breiter als lang.

Halsschild kaum schmäler als die Flügeldecken, etwas breiter als lang, nach rückwärts unmerklich verengt mit stark verrundeten Hinterecken, stark und sehr dicht längsrunzelig skulptiert, matt mit scharfer Mittelfurche.

Flügeldecken länger als der Halsschild, zusammen so lang als breit, mässig stark und nicht allzu dicht punktiert, etwas glänzend.

Hinterleib mässig fein und ziemlich dicht, etwas rauh punktiert.

Länge: 3 mm.

Loc. Seychellen. Praslin: Côtes d'Or Estate, Coco-de-Mer Wald in der Vallée de Mai, xi. 1908, 2 Exemplare.

35. *Medon duplicatus*, Fauv.

Loc. Seychellen. Silhouette: Mare aux Cochons, ix. 1908, 1 Exemplar.

Madagaskar.

36. *Scopaeus velutinus*, Motsch.

Scopaeus decipiens, Kraatz.

Loc. Seychellen: Long Island, vii. 1908, auf dem Strand, 1 Exemplar.

Ostindien, Ceylon, Borneo.

Tribus: **Xantholinini**.

37. *Leptacinus magniceps*, nov. spec.

Von *Leptacinus batychrus* Gyl. und den übrigen Verwandten durch den grossen Kopf und die fast gleichmässige Punktierung des Halsschildes und der Flügeldecken unterschieden.

Pechbraun, die Fühler, Taster und Beine rötlichgelb, glänzend.

Kopf viel breiter als der Halsschild, länger als breit, nach rückwärts stark, jedoch weniger erweitert als bei *trigonocephalus* Kraatz, längs der Mitte breit geglättet, sonst stark und mässig weitläufig punktiert. Fühler sehr gedrungen, ihre vorletzten Glieder fast dreimal so breit als lang.

Halsschild viel schmäler als die Flügeldecken, um ein Drittel länger als breit, an den Seiten ziemlich gerade, nach rückwärts schwach verengt, neben der breiten, geglätteten Mittelzone fein und ziemlich gleichmässig, hinten spärlicher punktiert, ohne deutliche Dorsal- oder Längsreihen.

Flügeldecken wenig länger als der Halsschild, fein und ziemlich gleichmässig, mässig dicht punktiert.

Hinterleib fein und ziemlich weitläufig punktiert.

Länge: etwas über 3 mm.

3 Exemplare.

Loc. "Seychelles. Silhouette: Mare aux Cochons, about 1000 ft., and coconut-planted country near sea-level at Pointe Étienne."

38. *Diochus punctipennis*, Motsch.; Fauvel, *op. cit.*, p. 117; Kolbe, *l.c.*

4 Exemplare.

Loc. Seychellen. Mahé: Gegend bei Port Glaud, 500—1000 ft., 5. xi. 1908. Long Island. Silhouette (viii. 1908).

Ostindien, Nordwest Australien.

Obwohl ich ein typisches Stück dieser Art nicht gesehen habe, halte ich den vorliegenden Käfer, welcher mit meinem australischen Exemplar vollkommen übereinstimmt, für die Motschulsky'sche Art, dessen Beschreibung gut auf den Käfer passt.

Tribus: **Staphylinini**.

39. *Philonthus fimbriolatus*, Er.; Fauvel, *op. cit.*, p. 118; Kolbe, *l.c.*

76 Stück. Überall häufig.

Loc. Seychellen. Silhouette, Mahé: "throughout the mountain-forests."

Madagaskar, Ostafrika, Erythraea.

40. *Philonthus bisignatus*, Boheman, var. *peregrinus*, Fauvel.

Philonthus peregrinus, Fauvel; *id.*, *op. cit.*, p. 118; Kolbe, *l.c.*

Dieses über das tropische und südliche Afrika weit verbreitete Tier ist auch auf den Seychellen einheimisch und daselbst an verschiedenen Fundorten nicht selten.

Loc. "The specimens, 18 in number, were found at several points in the forests of Silhouette and Mahé, extending up to about 2000 ft."

41. *Philonthus lacustris*, Bernh.

Loc. Aldabra: Takamaka, xi. 1908 (Fryer).

Ein einziges Stück. Bisher aus Abessinien und Deutsch-Ostafrika bekannt.

42. *Philonthus thermarum*, Aub.

Diese kosmopolitische, bei uns in brühwarmen Komposthaufen vorkommende Art wurde auf Mahé (Cascade Estate, Wald, 1000 ft., i. 1909) in einem einzelnen Stücke aufgefunden.

43. *Cafius nauticus*, Fairmaire; Fauvel, *op. cit.*, p. 117; Kolbe, *op. cit.*, p. 19.

Loc. Seychellen: Anonyme Island, 9. i. 1909; Long Island, vii. 1908; La Digue (Alluaud, 1892).

Polynesien, Hawai, Australien, Java, Ceylon, China, Madagaskar, Ostafrika.

44. *Cafius corallicola*, Fairmaire; Fauvel, *l.c.*; Kolbe, *l.c.*

Loc. Seychellen: Long Island, vii. 1908; Mahé, La Digue, Marie Anne, Round Island (Alluaud, 1892).

Djibouti, Perim, Madagaskar, Mauritius, Australien, Neu-Kaledonien, Tahiti.

Tribus: **Quediini.**

45. *Atanygnathus piceus*, Motsch.

Tanygnathus piceus, Motsch.; Fauvel, *op. cit.*, p. 118.

16 Stück.

Loc. "Seychelles: Silhouette, Mahé, La Digue. Silhouette; high forests, including two specimens from leaf-bases of a growing *Pandanus Hornei*, and two from leaf-bases of a palm. Mahé: Morne Blanc and Cascade, examples from leaf-bases of two different *Stevensonia*-palms. La Digue (Alluaud, 1892)."

Ostindien.

Tribus: **Tachyporini.**

46. *Conosoma rufiventre* (Fauvel).

Conurus rufiventris, Fauvel, *op. cit.*, p. 119; Kolbe, *l.c.*

25 Exemplare.

Loc. "Seychelles. Silhouette, Mahé, Praslin, La Digue. Silhouette: high forests, including one example from leaf-bases of a growing *Stevensonia*, at over 1500 ft., and one specimen from the decayed stem of a native palm; also one example from a nest of the ant *Pheidole punctulata*, Mayr (A. Forel det.), near the coast. Mahé: high forests of Morne Blanc, Cascade, and of the Mare aux Cochons district. Praslin: Côtes d'Or Estate. La Digue (Alluaud, 1892)."

47. *Conosoma alluaudi* (Fauvel).

Conurus alluaudi, Fauvel, *l.c.*; Kolbe, *l.c.*

33 Stück.

Loc. Seychellen. Mahé: Hochwald bei Morne Blanc, 1908; Cascade Estate, 800 ft. Silhouette: Hochwald bei Mont Pot-à-eau, viii. 1908; Mare aux Cochons, ix. 1908. Praslin: Côtes d'Or Estate, Coco-de-Mer Wald in der Vallée de Mai, xi. 1908; La Digue (Alluaud, 1892).

48. *Conosoma pedicularium*, Grav., var. *maheanum*, nov. var.

Diese Form, welche im übrigen von der langflügeligen Abart unseres einheimischen *pedicularium* Grav. kaum verschieden zu sein scheint, unterscheidet sich von der Stammform nur durch die in der Mitte schwach geschwärzten Fühler. 2 Exemplare.

Loc. Mahé: Cascade Estate, 1000—2000 ft., ii. 1909; Morne Blanc, 1000 ft., xi. 1908.

49. *Coproporus heterocerus* (Fauvel).

Cilea heterocera, Fauvel, *op. cit.*, p. 118; Kolbe, *l.c.*

31 Stück.

Loc. "Seychelles: Silhouette, Mahé, La Digue. Silhouette: from the high forests, and also from near the coast (one example recorded as taken from fungus). Mahé: high forest of Morne Blanc, and a number of specimens from the forests above Cascade, over 1000 ft." La Digue (Alluaud, 1892).

Sumatra.

50. *Coproporus tachyporoides*, Kraatz.

Loc. Silhouette: Mare aux Cochons, viii., ix. 1903, 5 Stück.

Sonst in Ostindien und Deutsch-Ostafrika.

51. *Coproporus marinus*, nov. spec.

In die unmittelbare Nähe des *Coproporus brunneicollis* Motsch. zu stellen, etwas kleiner, etwas weniger gewölbt, mit kürzerem Halsschild und besonders durch die weniger grob und viel dichter punktierten Flügeldecken zu unterscheiden*.

Der Halsschild ist kürzer, nach vorn etwas stärker verengt.

Die Färbung ist lichter rotbraun, die Fühler sind angedunkelt mit hellerer Wurzel und Spitze.

Während bei *brunneicollis* die Punktierung der Decken gegen die Naht zu feiner wird, ist sie bei der neuen Art fast gleichmässig.

Länge: 2·5 mm.

2 Exemplare.

Loc. Mahé: Cascade Estate, 1000 ft.; Hochwald bei Morne Blanc.

52. *Coproporus minimus* (Motsch.).

Cilea minima, Fauvel, *op. cit.*, p. 119; Kolbe, *l.c.*

64 Exemplare.

Loc. "Seychelles: Silhouette, Mahé, Praslin. Found in a number of places in the high forests of Silhouette and Mahé, and including some examples from the low country in the latter island." Mahé, Praslin (Alluaud, 1892).

Über die indo-malayische Region weit verbreitet, auch auf Réunion.

53. *Coproporus atomus*, Kraatz.

Loc. Seychellen: Silhouette, Mahé, Praslin.

Ebenfalls fast auf allen Fundstellen gefangen. 72 Stück.

Diese Art ist mir von Ceylon, den Philippinen, Nias-Inseln und Madagaskar bekannt.

Tribus: **Oligotini**.

54. *Oligota chrysopyga*, Kraatz.

Loc. Mahé: Cascade Estate, 800—1000 ft., i. and ii. 1909, 36 Exemplare.

Ceylon.

* In der Mitte zwischen dieser Art und *brunneicollis* Motsch. liegt eine Art aus Formosa, welche ich *Coproporus formosae* benenne und welche die gewölbtere Körperform mit der letztgenannten Art, die feinere und dichtere Punktierung der Flügeldecken mit *marinus* gemeinsam hat.

Tribus: **Bolitocharini.**

55. *Gyrophaena plicata*, Fauvel, *op. cit.*, p. 120; Kolbe, *l.c.*

60 Stück.

Loc. "Seychelles: Mahé, Silhouette, Praslin. From a number of places in the mountain-forests, and in Mahé also from marshy ground and from cultivated country near sea-level. Praslin: a large number from Côtes d'Or Estate, xi. 1908, and also taken by Alluaud in 1892."

Madagaskar.

56. *Placusa insularis*, nov. spec.

Von der Gestalt einer sehr kleinen *Atheta myrmecobia*, äusserst fein und äusserst dicht, die Flügeldecken ein klein wenig stärker und weniger dicht punktiert, mit sehr geringem Glanze.

Der Käfer ist ziemlich gleichbreit, nach vorn jedoch verengt, indem der Kopf viel schmäler als der Halsschild, dieser etwas schmäler als die Flügeldecken ist.

Fühler sehr kurz, gegen die Spitze stark verdickt, das 3. Glied kaum halb so lang als das zweite, deutlich quer, die folgenden ziemlich gleichgebildet, sehr stark quer, mindestens doppelt so breit als lang, das Endglied dick, etwas breiter als die vorletzten, so lang als die zwei vorhergehenden zusammengenommen.

Halsschild doppelt so breit als lang, die Flügeldecken etwas länger als der Halsschild.

Länge: 1·2—1·4 mm.

Loc. Silhouette: Mare aux Cochons, ix. 1908, 1 Stück.

Unter der Rinde von *Dracaena*.

57. *Diestota testacea*, Kraatz.

Loc. Mahé: Hochwald zwischen Trois Frères und Morne Seychellois, 1500—2000 ft., xii. 1908, 1 Exemplar.

Indo-malayisches Gebiet, Neu-Britannien, Queensland, Südfrankreich.

58. *Leptusa tropica*, nov. spec.

Ziemlich von der Körpergestalt der *fuliginosa* Aub., etwas kleiner, durch kürzere Flügeldecken und die Geschlechtsauszeichnung des ♂ leicht zu unterscheiden.

Bräunlichrot, wenig glänzend, die Fühler, Taster und Beine rötlichgelb, die Flügeldecken und der Hinterleib vor der Spitze gebräunt.

Kopf viel schmäler als der Halsschild, mässig fein und sehr dicht punktiert, fast matt, mit ziemlich grossen Augen, die Schläfen hinter ihnen ungefähr so lang als der von oben sichtbare Längsdurchmesser der Augen. Fühler gegen die Spitze verdickt, ihr 3. Glied, kürzer als das zweite, das vierte quer, die folgenden allmählich breiter werdend, die vorletzten mehr als die Hälfte länger als breit, das Endglied heller gelb, so lang als die zwei vorhergehenden zusammengenommen.

Halsschild fast so breit als die Flügeldecken, ziemlich stark quer, vor der Mitte gerundet, nach rückwärts fast ausgeschweift verengt, mit scharf stumpfwinkeligen Hinterecken, vor dem Schildchen mit einem Quereindruck, ähnlich wie der Kopf punktiert.

Flügeldecken kaum so lang als der Halsschild, stärker als der Vorderkörper, rauh und etwas weniger dicht punktiert, matt.

Hinterleib gleichbreit, ziemlich fein und mässig dicht, hinten feiner und weitläufiger punktiert, ziemlich glänzend.

Länge: 1·2 mm.

Beim ♂ ist die Naht der Flügeldecken hinter dem Schildchen in grosser Ausdehnung kielförmig aufgeworfen, das 7. Tergit auf der hinteren Hälfte mit zwei gebogenen glänzenden Fältchen.

28 Exemplare.

Loc. "Seychelles: Silhouette, Mahé, Praslin. Silhouette: high forests, including one specimen taken from leaf-bases of a palm (the same individual tree yielded examples of *Leptusa longicollis*, *Paracyphea tenuipunctata*, and *P. maheana*). Mahé: two specimens from leaf-bases of a growing *Stevensonia*, near Morne Blanc. Praslin: Côtes d'Or Estate."

59. *Leptusa rudepunctata*, nov. spec.

Der vorigen Art äusserst nahe verwandt, ein klein wenig grösser, durch viel stärkere und weitläufigere, viel rauhere Punktierung des Kopfes, Halsschildes und der Flügeldecken, stärkeren Glanz und längeren Halsschild leicht zu unterscheiden.

Der Halsschild ist nur um ein Drittel breiter als lang, an den Seiten mehr gleichmässig gerundet, in der Mittellinie deutlich gefurcht.

Geschlechtsauszeichnungen treten bei den bisher bekannten 2 Stücken nicht deutlich hervor.

Länge: 1·6 mm.

Loc. Praslin: Côtes d'Or Estate, Coco-de-Mer Wald in der Vallée de Mai, xi. 1908.

60. *Leptusa longicollis*, nov. spec.

Mit den beiden vorhergehenden Arten sehr nahe verwandt, von der erstgenannten durch etwas grössere Gestalt, stärkeren Glanz und viel weniger dichte Punktierung des ganzen Körpers, besonders auch des Hinterleibes und durch längeren und schmäleren Halsschild, von *rudepunctata* m. durch viel schmäleren und längeren, hinten stärker und etwas ausgeschweift verengten Halsschild, das Quergrübchen vor dem Schildchen, den Mangel der Mittelfurche, längere Flügeldecken und weitläufigere Punktierung des Hinterleibes sofort zu unterscheiden.

Der Körper ist nach vorn verjüngt, der Halsschild viel schmäler als die Flügeldecken, nur um ein Viertel länger als breit, ziemlich gewölbt.

Die Färbung ist rotbraun bis pechbraun, mit hellerer Hinterleibswurzel, Fühler und Beine rötlichgelb.

Länge: 1·5 mm.

Die Geschlechtsauszeichnung des ♂ ist ähnlich wie bei *tropica* m., nur sind die 2 Längsfältchen am 7. Tergit in winzige Höckerchen reduziert und die Naht der Flügeldecken ist feiner und bis zum Hinterrande kielförmig erhoben.

4 Exemplare.

Loc. "Seychelles. Silhouette: from the high forest, three of the specimens being taken from leaf-bases of the palm mentioned above, in company with *L. tropica* and the two species of *Paracyphea*."

61. *Leptusa sechellarum*, nov. spec.

Ebenfalls mit *Leptusa tropica* m. näher verwandt, fast von derselben Gestalt und Grösse, heller gefärbt, durch die wohl dreimal weitläufigere und dabei feinere Punktierung, sowie den ziemlich starken Glanz des ganzen Körpers leicht zu unterscheiden.

Rötlichgelb, die Flügeldecken mit Ausnahme der Wurzel und der Hinterleib vor der Spitze schwach angedunkelt.

Die Fühler ähnlich wie bei *tropica*.

Kopf ziemlich fein und weitläufig punktiert, die Schläfen wie bei *tropica*.

Halsschild ähnlich wie der Kopf, jedoch ein klein wenig weniger weitläufig punktiert, die Seiten mehr gleichmässig gerundet, nach rückwärts etwas weniger verengt als bei *tropica*.

Die Flügeldecken sind etwas länger als der Halsschild, stärker als dieser, aber weitläufiger punktiert, glänzend.

Hinterleib spärlich punktiert, glänzend.

Länge: 1·2—1·7 mm.

Beim ♂ besitzt das 7. Tergit in der Mitte der Scheibe zwei winzige Höckerchen, die Naht ist äusserst schmal erhoben.

Loc. Praslin: Côtes d'Or Estate, Coco-de-Mer Wald in der Vallée de Mai, xi. 1908.

ANEBOLURA, nov. gen.

In die unmittelbare Nähe von *Phymatura*, J. Sahlberg, zu stellen, von ihr durch die seitlich deutlich sichtbaren Epipleuren des Halsschildes, etwas andere Gestalt des letzteren, ungekielte Mittelbrust und die tief und schmal ausgehöhlte Wurzel der ersten freiliegenden Tergite wohl gewiss generisch zu trennen:

Klein, der Kopf hinten kaum eingeschnürt, die Schläfen unten vollständig und scharf gerandet.

Fühler gedrungen, ihr drittes Glied sehr dünn, viel schmäler und kürzer als das zweite, das vierte stark quer, die folgenden allmählich breiter und kürzer werdend, die vorletzten fast doppelt so breit als lang, das letzte gross, eiförmig zugespitzt, länger als die zwei vorhergehenden zusammengenommen. Oberlippe quer, vorn fast gerade abgestutzt. Die Kiefer kurz, die Spitze etwas hakig gekrümmt, innen schwach eckig vorspringend. Die Innenlade der Kiefertaster schmal, an der Innenseite kaum häutig, mässig dicht mit breiten und langen Stacheln besetzt, die Aussenlade breiter, an der häutigen, breit abgestutzten Spitze dicht behaart. Kiefertaster ziemlich lang und schlank, das vorletzte Glied keulig verdickt, an der Wurzel schmal, das Endglied sehr schmal pfriemenförmig, aber sehr lang gestreckt, kaum um ein Viertel kürzer als das vorletzte. Das Kinn trapezförmig, vorn leicht ausgerandet. Die Zunge schmal und gestreckt, an der Spitze bis zur Mitte gespalten, die beiden Zipfel von ihrer Längsmitte an plötzlich verschmälert. Die Lippentaster schlank, ihr erstes Glied um ein Drittel länger als breit, gegen die Spitze verschmälert, das zweite viel schmäler, aber nur mässig kürzer als das erste, das Endglied sehr schmal, viel schmäler und länger als das zweite.

Halsschild gewölbt, deutlich, aber nur mässig schmäler als die Flügeldecken, die Epipleuren bei seitlicher Ansicht deutlich und breit sichtbar.

Flügeldecken etwas gewölbt, hinten innerhalb der äusseren Ecken deutlich ausgebuchtet.

Hinterleib gleichbreit, dick gerandet, an der Wurzel der drei ersten freiliegenden Tergite sehr tief und schmal quer eingedrückt.

Mittelbrust ungekielt, hinten zugespitzt, die Spitze aber etwas abgestutzt, die Mittelhüften etwas von einander abgerückt.

Beine ziemlich kurz, die Vorder- und Mitteltarsen vier-, die Hintertarsen fünfgliedrig. An den Vordertarsen die drei ersten Glieder kurz, das Endglied länger als alle drei zusammengenommen, die Mitteltarsen ähnlich gebildet, jedoch gestreckter. An den Hintertarsen ist das erste Glied etwas kürzer als die zwei folgenden, das 5. länger als die zwei vorhergehenden zusammengenommen.

Das Tierchen wurde im feuchten Waldgebiet ungefähr in einer Seehöhe von 1500 ft. gefangen.

62. *Anebolura minutissima*, nov. spec.

Dunkel rötlichgelb, stark glänzend, der Hinterleib vor der Spitze breit geschwärzt, die Fühler gegen die Spitze undeutlich gebräunt, die Taster und Beine heller rötlichgelb.

Kopf viel schmäler als der Halsschild, fein und spärlich punktiert, die Augen mässig klein, die Schläfen ungefähr so lang als deren Längsdurchmesser.

Halsschild mässig schmäler als die Flügeldecken, um mehr als die Hälfte breiter als lang, vor der Mitte gerundet erweitert, vor dem Schildchen ohne deutlichen Eindruck, sehr fein und spärlich punktiert.

Flügeldecken etwas länger als der Halsschild, stärker als dieser, aber ebenso weitläufig punktiert.

Hinterleib sehr fein, undeutlich und spärlich punktiert, stark glänzend.

Länge: 1·2—1·5 mm.

Beim ♂ besitzt das 7. Tergit eine Anzahl von Längskörnchen und Fältchen.

11 Exemplare.

Loc. Seychellen. Félicité Island: Waldgebiet, 14—17. xii. 1908. Mahé: Morne Seychellois, ober 1500 ft., 4. ii. 1909; Morne Blanc, 1000 ft., 3. ii. 1909; Cascade Estate, 800—1500 ft., 1909; feuchter Hochwald zwischen Trois Frères und Morne Seychellois, 1500—2000 ft., xii. 1908. Silhouette: Wald bei Mare aux Cochons, 22. ix. 1908*.

Paracyphea, nov. gen.

Der vorherbeschriebenen Gattung ziemlich nahe verwandt, von ihr durch anders gebildete Zunge und Lippentaster und durch die normal eingedrückten Querfurchen an der Wurzel der Tergite, von *Phymatura* durch nicht gekielte Mittelbrust, die bei seitlicher Ansicht deutlich und breit sichtbaren Epipleuren des Halsschildes, von beiden durch viel breiteren Halsschild, von *Cyphea*, der die Gattung habituell sehr ähnlich ist, durch die Bildung der Zunge und der Lippentaster leicht abzutrennen.

Im Allgemeinen sind die generischen Merkmale denen von *Anebolura* ziemlich ähnlich und ich charakterisiere daher nur jene, die eine greifbare Verschiedenheit aufweisen.

Die Mundteile weisen mit Ausnahme der Zunge und Lippentaster keine grundlegende Verschiedenheit auf. Die Zunge dagegen ist an der Spitze verhältnismässig nur wenig tief, dreieckig ausgeschnitten, sie ist sehr schmal und reicht ungefähr bis zur Hälfte des 2. Lip-

* One of the Silhouette examples was taken from leaf-bases of a growing palm (*Stevensonia*).

pentastergliedes. Die Lippentaster sind mehr allmählich nach der Spitze zu verjüngt, das 2. Glied nur wenig schmäler und wenig kürzer als das erste, das dritte nur mässig schmäler und kaum länger als das zweite.

Halsschild mindestens so breit als die Flügeldecken, stark quer, die umgeschlagenen Seiten bei seitlicher Ansicht deutlich sichtbar.

Flügeldecken am Hinterrande innerhalb der Hinterecken nicht ausgebuchtet.

Hinterleib ziemlich gleichbreit, an der Wurzel der ersten freiliegenden Tergite normal eingedrückt.

An den 5-gliedrigen Hintertarsen ist das erste Glied nur mässig länger als das zweite, das Endglied sehr gestreckt, viel länger als die zwei vorhergehenden zusammengenommen.

63. *Paracyphea tenuipunctata*, nov. spec.

Pechschwarz bis pechbraun, die Wurzel und Spitze des Hinterleibes heller, die Fühler, Taster und Beine rötlichgelb.

Kopf halb so breit als der Halsschild, fein und ziemlich dicht punktiert, wenig glänzend. Augen mässig gross, die Schläfen hinter ihnen ungefähr so lang als ihr Längsdurchmesser. Fühler gegen die Spitze ziemlich verdickt, das dritte Glied kaum kürzer und nur wenig schmäler als das zweite, das vierte kaum, die folgenden deutlich quer, die vorletzten um die Hälfte breiter als lang, das Endglied länger als die vorhergehenden zwei zusammengenommen.

Halsschild fast breiter als die Flügeldecken, fast doppelt so breit als lang, an den Seiten stark gerundet, nach rückwärts deutlich ausgeschweift verengt, mit scharfen Hinterecken, vor dem Schildchen kaum eingedrückt, ziemlich fein und sehr dicht, etwas rauh punktiert und dicht grau behaart, matt.

Flügeldecken so lang als der Halsschild, zusammengenommen stark quer, etwas stärker, rauher und etwas weniger dicht punktiert als der Halsschild, fast matt, graubehaart.

Hinterleib ziemlich fein und ziemlich weitläufig, hinten spärlich punktiert, glänzend, länger als der Vorderkörper behaart.

Länge: 1·3—1·7 mm.

Beim ♂ ist das 7. Tergit mit zwei Längsfältchen bewehrt.

16 Stück.

Loc. "Seychelles: Silhouette, Mahé. Silhouette: high forests; one example being from leaf-bases of the palm referred to (p. 180), in company with *Leptusa tropica*, etc. Mahé: near Morne Blanc."

64. *Paracyphea asperata*, nov. spec.

Von den beiden anderen Arten durch die tiefdunkle Färbung, viel stärker nach rückwärts verengten und dadurch schmäler erscheinenden Halsschild und besonders die kräftige und mindestens doppelt so weitläufige Punktierung der Flügeldecken und des Vorderkörpers auf den ersten Blick zu unterscheiden.

Die Farbe ist schwarz, die Beine und Fühler angedunkelt, letztere mit hellerer Wurzel.

Der Halsschild ist vor der Mitte stark erweitert, daselbst so breit als die Flügeldecken an den Schultern, nach rückwärts stark ausgeschweift verengt mit scharfen Hinterecken.

Der Vorderkörper ist weniger matt, als bei den vorigen Arten, die Flügeldecken kräftig und wenig dicht punktiert, glänzend.

Der Hinterleib ist spärlich punktiert, stark glänzend.

Länge: 1·5 mm.

Beim ♂ besitzt das 7. Tergit ausser zwei kräftigen Längsfältchen zu beiden Seiten der Mitte noch eine Anzahl von kräftigen Längskörnchen. Die Naht der Flügeldecken ist fast der ganzen Länge nach kielförmig erhoben.

21 Exemplare.

Loc. "Seychelles: Silhouette, Mahé, Praslin. Silhouette, high forests: one example was taken from leaf-bases of a growing *Pandanus Hornei*; seven others from leaf-bases of a growing *Pandanus seychellarum*; two specimens from leaf-bases of a growing *Roscheria*-palm; and two others from leaf-bases of the palm already referred to (p. 180), in company with *Leptusa longicollis*, etc. Mahé: high damp forest at summit of Morne Pilot, over 2000 ft.; near Morne Blanc, about 1000 ft. Praslin: three examples from leaf-bases of a growing Coco-de-Mer (*Lodoicea*), Vallée de Mai, xi. 1908."

65. *Paracyphea maheana*, nov. spec.

Der vorhergehenden Art äusserst nahe stehend, bei einiger Aufmerksamkeit jedoch durch stärkere, rauhere und etwas weniger dichte Punktierung, besonders aber durch das nur spärlich punktierte Abdomen und dessen stärkeren Glanz zu unterscheiden.

Der Halsschild ist nicht ganz so breit als bei *tenuipunctata*, die Färbung etwas dunkler, der Körper etwas kleiner und die Geschlechtsauszeichnung des ♂ auf 2 kleine Höckerchen reduziert.

Länge: etwas über 1 mm.

12 Stück.

Loc. "Seychelles: Silhouette, Mahé, and Marie Anne Islands. Silhouette: forest above Mare aux Cochons, one specimen being from leaf-bases of *Pandanus Hornei*. Mahé: eight examples from leaf-bases of a *Stevensonia* near Morne Blanc; one from forest above Cascade, 1000—2000 ft. Marie Anne Island, from drier type of forest near sea-level, one specimen."

66. (?) *Bolitochara amabilis*, Motsch.

Loc. Seychellen: Long Island, vii. 1908 (1 Exemplar).

Ceylon.

Tribus: **Myrmedoniini**.

67. *Falagria coarcticollis*, Fauvel, *op. cit.*, p. 121; Kolbe, *l.c.*

Loc. "Mahé: marshes on coastal plain at Anse aux Pins and Anse Royale, 19—21. i. 1909," 1 Stück.

Madagaskar, Mauritius, La Réunion, Sansibar, Gabun, Senegal, Ostafrika.

68. *Coenonica puncticollis*, Kraatz; Fauvel, *op. cit.*, p. 122; Kolbe, *l.c.*

Loc. Silhouette: Mont Pot-à-eau, 1500 ft., viii. 1908; Mare aux Cochons, 6. ix. 1908; 4 Exemplare.

Ceylon, Ostindien, Sarawak, Tropisches Afrika, Queensland, Insel Juan Fernandez, Aegypten, England.

69. *Atheta* (subg. *Atheta*, s. st.) *laeticollis*, Fauvel, *op. cit.*, p. 121; Kolbe, *l.c.*

Loc. Silhouette: Hochgegend nahe Mont Pot-à-eau, viii. 1908; Mare aux Cochons, ix. 1908. Mahé: Morne Blanc, 1000 ft., xi. 1908; Hochwald von Morne Blanc und Pilot, xi. 1908; Cascade Estate, 800—1000 ft., i.—iii. 1909; Mare aux Cochons Distrikt, 1000—2000 ft., i.—ii. 1909. Praslin (Alluaud, 1892).

65 Stück. Die Art scheint überall recht häufig zu sein.

70. *Atheta* (subg. *Atheta*, s. st.) *coriaria*, Kraatz.

Diese fast über die ganze Erde verbreitete, bei uns in brühheissen Komposthaufen vorkommende Art wurde an zahlreichen Stellen der Inselgruppe aufgefunden (Mahé, Silhouette, und Marie Anne Islands: 24 Exemplare).

71. *Atheta* (subg. *Atheta* s. st.) *dilutipennis* Motsch.

(*Atheta mucronata* Kraatz, *putrescens* Woll., *subputrescens* Woll., *destituta* Waterh.)

19 Exemplare.

Loc. Silhouette: Hochgegend nahe Mont Pot-à-eau, viii. 1908; Mare aux Cochons. Mahé: Hochwald bei Morne Blanc, x. 1908; Wald bei Cascade Estate, i.—ii. 1909, 1000 ft. Praslin: Côtes d'Or Estate, besonders vom Coco-de-Mer Wald in der Vallée de Mai, xi. 1908. Marie Anne Island, aus dem Walde von "Takamaka," "Bois de Natte," u.s.w., 3. xii. 1908.

In der indo-malayischen Fauna und im tropischen Afrika bis zu den canarischen Inseln verbreitet.

72. *Atheta* (subg. *Metaxya*) *insularis*, nov. spec.

Von den übrigen Arten durch die an *Liogluta* erinnernde robuste Körpergestalt und die rauhe Punktierung verschieden.

Tiefschwarz, die Schienen und Tarsen schmutzig rötlichgelb.

Kopf viel schmäler als der Halsschild, kräftig und dicht punktiert, etwas glänzend, die Schläfen hinten kurz gerandet. Fühler sehr dünn und gestreckt, gegen die Spitze kaum verdickt, ihr drittes Glied länger als das zweite, das vierte doppelt so lang als breit, die folgenden allmählich etwas kürzer werdend, das vorletzte jedoch noch immer viel länger als breit, das Endglied sehr gestreckt, fast dreimal so lang als breit, so lang als die zwei vorherigen zusammen. Halsschild etwas schmäler als die Flügeldecken, höchstens um ein Drittel breiter als lang, an den Seiten gleichmässig gerundet, mit stumpfwinkeligen Hinterecken, rauh und dicht punktiert, matt.

Flügeldecken wenig länger als der Halsschild, noch rauher und dichter punktiert als der letztere.

Hinterleib gleichbreit, mässig fein, etwas rauh und dicht, nach hinten allmählich etwas weniger dicht, am siebenten Tergit ziemlich weitläufig punktiert.

Länge: 3—4·2 mm.

Beim ♂ ist das siebente Tergit am Hinterrande undeutlich gezähnelt, das sechste Sternit gerundet vorgezogen.

Loc. Silhouette: Pot-à-eau, viii. 1908, 1500 ft., 8 Exemplare.

73. *Atheta* (subg. *Acrotona*) *flavocephala*, nov. spec.

Ganz von der Gestalt der *Atheta fungi* Grav., durch die eigenartige Färbung sofort kenntlich.

Schwarz, glänzend, gewölbt, der Kopf und die Wurzel der bräunlichen Fühler rötlichgelb, die Beine pechbraun mit helleren Schienen und Tarsen.

Kopf halb so breit als der Halsschild, mit kurzen, den Längsdurchmesser der Augen nicht erreichenden, unten gerandeten Schläfen, sehr fein und spärlich punktiert. Fühler gegen die Spitze etwas verdickt, das 3. Glied wenig kürzer als das zweite, die vorletzten schwach quer.

Halsschild so breit als die Flügeldecken an den Schultern, um mehr als die Hälfte länger als breit, an den Seiten gleichmässig gerundet, sehr fein und weitläufig punktiert, die umgeschlagenen Seiten bei seitlicher Ansicht kaum sichtbar.

Flügeldecken wenig länger als der Halsschild, etwas stärker und weniger weitläufig als dieser punktiert.

Hinterleib nach hinten deutlich verengt, fein und weitläufig, hinten spärlich punktiert.

Länge: nicht ganz 2 mm.

Deutliche Geschlechtsauszeichnungen treten nicht hervor.

4 Exemplare.

Loc. "Seychelles: Mahé, Félicité. Mahé: Cascade Estate, about 1000 ft., and forest above. Félicité: forest of the drier type, near sea-level, xii. 1908."

Tribus: **Aleocharini.**

74. *Aleochara funesta*, Bernhauer.

23 Stück.

Loc. Mahé: Cascade Estate, 1000 ft., 1908—9.

Westafrika.

No. III.—A GEOGRAPHICAL SUMMARY BASED ON DR MAX BERNHAUER'S ENUMERATION OF THE STAPHYLINIDÆ OF THE SEYCHELLES, CHAGOS, AND ALDABRA ISLANDS, WITH NOTES ON THEIR BIOLOGY.

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(Communicated by Professor J. Stanley Gardiner, M.A., F.R.S., F.L.S.)

Read 5th May, 1921.

In the foregoing report (pp. 165—186) Dr Bernhauer has given a systematic account of all the Staphylinidæ collected by the Percy Sladen Trust Expedition. The present article constitutes an attempt to summarise the geographical distribution and affinities of these forms. Opinions as to the relationships of particular species with their congeners are drawn from the systematic report. Records of the range of non-endemic species are taken partly from Dr Bernhauer's manuscript and letters, partly from the Catalogue of Staphylinidæ*. But though it is founded on information derived from these sources, the present writer holds himself alone responsible for any more general views expressed in this summary.

A *résumé* of biological data is also given, based on the writer's collecting experiences and journal. He has also checked the lists of localities in Dr Bernhauer's report, and the remarks in English and in inverted commas are drawn up from his field notes.

* * * * *

Seventy-four species of Staphylinid beetles were collected by the Expedition. Seventy-one of these were taken in the Seychelles, and only three in the other groups of islands visited. They may be discussed as follows:

Chagos Islands.

From this purely coralline group, the easternmost, and almost the northernmost, archipelago visited, one species, *Trogophlœus* (*Carpalimus*) *chagosanus*, n. sp., is described. It has several points of resemblance with *T.* (*C.*) *palustris*, n. sp., from the lower levels in the Seychelles. The genus and subgenus are known from all parts of the world. No other Staphylinid was received from the Chagos group.

Aldabra.

Two species were found in this coral atoll of peculiar formation, the southwesternmost point of the range of the Expedition, the closest to Africa, and almost the closest to Madagascar. The first, *Bledius marinus*, n.sp., in some ways resembles a form of the Palæarctic *B. fracticornis*, Payk. The insects of this genus are known from all parts of the world, living in winding burrows which they excavate in sandy river-banks and on the sea-coast. The second species, *Philonthus lacustris*, Bernhauer, was known hitherto from Abyssinia. There seems to be no previous published record of any Staphylinid from Aldabra. Neither Kolbe's account of the beetles collected there by Voeltzkow (Abh. Senckenb. Ges., xxvi. p. 569, 1902), nor Linell's report on those obtained by Abbot in Aldabra and Glorioso (Proc. U.S. Nat. Mus., xix. p. 695, 1897), mentions any member of this family.

* *Coleopterorum Catalogus* (Junk and Schenkling); parts 19, 29, 40, 57, 67 (1910—1916), by Bernhauer and Schubert, deal with Staphylinidæ, but the whole family is not yet covered.

Seychelles.

These mountainous islands, ancient and granitic, with their highly peculiar endemic forests, are rich in Staphylinidæ. Fauvel (Rev. d'Ent., Caen, xvii. p. 114, 1898) enumerated 28 species from the material collected by Alluaud in 1892, 11 of these being described as new. Kolbe (Mitt. Zool. Mus. Berlin, v. p. 3, 1910) reporting on those taken in the islands by Brauer, added one more (*Osorius sechellarum*, described as new), making 29 in all. The collection at present under review contains 71 species. But 10 of the species included in Fauvel's report have not been found again by the Percy Sladen Trust Expedition. Assuming therefore that these are really distinct from any in the present collections, the total number known from the Seychelles is 81 species.

The ten species recorded by Fauvel but not by Bernhauer are the following. Their known range outside the Seychelles is briefly indicated. They are not referred to in Dr Bernhauer's systematic report.

Lispinus castaneus, Fauvel (New Guinea).
Oxytelus nitidifrons, Wollaston (St Helena, Singapore, Hawaiian Is.).
Oxytelus ferrugineus, Kraatz (throughout warmer parts of world).
Holotrochus curticollis, Fauvel (Madagascar).
Medon microthorax, Fauvel (Madagascar).
Scopæus limbatus, Kraatz (Oriental Region).
Philonthus dilutipes, Fauvel (Madagascar, Mascarenes, Java).
Philonthus peliomerus, Kraatz (St Helena and Oriental Region).
Coproporus exul, Fauvel (New Caledonia).
Aleochara puberula, Klug (Madagascar, Singapore, Europe).

The 81 species recorded from the archipelago represent 16 tribes* and 39 genera. Among them 2 genera, 28 species, and 1 variety of a widespread species, are described by Bernhauer as new to science. These latter, of course, are known only from the Seychelles, as are 6 other species previously described (by Fauvel and Kolbe), making 34 species in all not known from outside the islands†.

* Piestini, Omaliini, Oxytelini, Osoriini, Stenini, Euæsthetini, Pinophilini, Pæderini, Xantholinini, Staphylinini, Quediini, Tachyporini, Oligotini, Bolitocharini, Myrmedoniini, Aleocharini.

† The Hawaiian Islands—much larger than the Seychelles, but purely volcanic—have 119 species, *i.e.* 24 foreign forms included in 16 genera, and 95 endemic species in 13 genera. As instances of the remarkable contrasts exhibited by the two faunas may be mentioned the following. In the Hawaiian Islands *Oligota* has 28 species, all endemic, and the allied endemic genus *Liophæna* contains another 3 species: in the Seychelles only one species of *Oligota* has been found, and that is known also from Ceylon. In the Hawaiian Islands there are 29 species of *Diestota*, all but one being endemic, and there are two closely related, monotypic, endemic genera: in the Seychelles, only one *Diestota*, and that very wide ranging. *Myllæna* has 11 species, all endemic, in the Hawaiian Islands: in the Seychelles this genus has not been found at all. [See *Fauna Hawaiiensis*, i. pp. cxiii, cxxxvii; iii. p. 538 sqq.] There is almost nothing in the Seychelles Staphylinid fauna approaching these great Hawaiian "endemic complexes" belonging to single genera. The largest number of species belonging to one genus in the Seychelles is exhibited by the 10 species of *Medon*, 8 of which are described as new: [in the Hawaiian Islands this genus has only two representatives, both foreign to the endemic fauna, while two allied genera contain 5 other species, probably endemic]. The Seychelles indeed possess 6 species of *Lispinus*, but 5 of these occur in other parts of the world; and 6 species of *Coproporus*, but again all but one are known from elsewhere. On the other hand, the 4 species of *Leptusa* and the 3 species of *Paracyphea* are almost certainly endemic.

These contrasts may be taken as typical of what may prove to be the difference between the whole Coleopterous faunas of the two archipelagoes. Leaving out of account imported forms, in the Seychelles the endemic beetle fauna will probably be found to be composed of more genera in proportion to its size; but fewer

The 81 forms may be roughly tabulated thus:

I.	Species belonging to genera which are known only from the Seychelles	4
II.	Species known only from the Seychelles, but belonging to widespread genera ...	30
III.	Species known also from other countries	47
		81

I. The two new genera both belong to the Bolitocharini. *Anebolura*, n.g., represented by a single species, is stated to be very close to *Phymatura*, a genus containing three known species, one European and two Brazilian. *Paracyphea*, n.g., represented by three species, is fairly near to *Anebolura* and to *Cyphea*, the latter of which is known only from a single species, and that European.

II. Of the 30 other species known only from the Seychelles, but belonging to widespread genera, 24 are described as new in Dr Bernhauer's report, 5 were previously described by Fauvel and 1 by Kolbe. It is not easy to summarise their affinities from a geographical point of view. *Paragonus insularis*, n.sp., belongs to a genus only three other species of which are catalogued (1911), all of them from the Oriental Region*. The other forms belong to 15 genera, which, as at present understood, occur in all parts of the world, or at any rate in several of the great geographical regions. Seven of the species are included in the great genus *Medon*, 4 in *Leptusa*; the remaining 18 represent 13 genera. Nor do the species themselves seem to present predominant affinities with their congeners in any one region.

The following is a brief summary of what is said as to the specific affinities of these forms by Bernhauer and the other writers: Oriental: *Paragonus insularis*, n. sp., has Oriental affinities (see above); *Medon strigosus*, n. sp., is near a Ceylon species; *M. cephalotes* and *M. nigripennis*, n. spp., also appear to be near Oriental forms. Oriental and Africa: *Coproporus marinus*, n. sp., is near a species known from both these regions. Madagascar: *Stenus silvicola*, n. sp., is probably very close to a Madagascar species. Madagascar and Africa: *Osorius sechellarum* is regarded by Kolbe (*op. cit.* p. 37) as belonging to the "Afro-Madagascan" element in the Seychelles fauna. Africa: *Espeson scotti*, n. sp.,

of these genera will be confined to the islands, and many are represented by single species, or by a few species clearly separated one from the other. In the Hawaiian Islands, on the other hand; possibly fewer genera in proportion to the size of the fauna, but more of them endemic, and many containing large numbers of species constituting "remarkable networks of precinctive forms" [Dr Sharp, *Fauna Haw.*, iii. p. 554], and often very hard to distinguish clearly from one another. The peculiar group of Seychellean weevils, Phœnicobatina, is an exception to this, for in numbers it vies with the Hawaiian "endemic complexes": *Phœnicobates* contains 25 species, and two allied genera include another 3 species.

T. V. Wollaston enumerated from Madeira 116 species of Staphylinidæ belonging to 39 genera (*Coleopt. Atlantidum* (1865), Appendix, pp. 113—117; also the addenda to that work, published at the end of *Coleopt. Hesperidum*, p. 277); from the Canaries, 145 species belonging to 41 genera (*l. c.*); and from the dry and barren Cape Verde Islands, 40 species belonging to 21 genera (*Coleopt. Hesperidum* (1867), pp. 270—272). These figures take no account of subsequent additions to our knowledge of the faunas of these islands.

* The terms "Oriental," "Indo-Malay," and "Australasian," are here used in the usually accepted zoogeographical sense. "Oriental" includes India, Ceylon, Further India, Malay Peninsula, etc., and all the Indo-Malay islands of the Eastern Archipelago. "Indo-Malay" signifies a part of the "Oriental Region," *i.e.* that portion of the Eastern Archipelago lying west and north of the line dividing the Australasian from the Oriental Region. "Australasian" includes New Guinea and the other islands east of that dividing line, together with Australia, New Zealand, and the South Pacific Islands.

the two new species of *Edaphus*, and probably *Trogophlæus palustris*, n. sp., are near to African species of their respective genera. Australasia: *Lispinus politulus* is stated by Fauvel (*l.c.*) to be close to *L. castaneus*, a species known both from New Guinea and the Seychelles. Palæarctic: *Atheta læticollis*, Fauvel, and the four new species of *Leptusa*, appear to have some points of resemblance with certain Palæarctic forms. World-wide: *Medon testaceorufus*, n. sp., is near the almost world-wide *M. debilicornis*, Woll., and *Leptacinus magniceps*, n. sp., and *Atheta flavocephala*, n. sp., in some ways resemble very widespread species of their respective genera. Nothing is said about the specific affinities of the other ten of these forms.

III. Lastly there are the 47 widespread species (37 of these being represented in the collections of the Percy Sladen Trust Expedition, and the other 10 being those listed above which were not obtained during that Expedition). They may be grouped as follows. The large number of headings is rendered necessary by the fact that many of them are known from two or more regions.

Known from (i) Oriental Region, 10 species: *Eleusis kraatzi*, Fauv., *Lispinus specularis*, Bernh., *Phlœonomus singularis*, Kr., *Scopœus velutinus*, Motsch., *S. limbatus*, Kr., *Atanygnathus piceus*, Motsch., *Coproporus heterocerus*, Fauv., *C. atomus*, Kr., *Oligota chrysopyga*, Kr., *Bolitochara amabilis*, Motsch.: [only a single example is doubtfully referred to the last]. (ii) Both Oriental and Japan: *Stilicus ceylanensis*, Kr. (iii) Oriental and Madagascar-Mascarene: *Palaminus pennifer*, Fauv., *Philonthus dilutipes*, Fauv., *Coproporus minimus*, Motsch. (iv) Oriental, Madagascar-Mascarene, and Africa: *Philonthus peregrinus*, Fauv. (v) Oriental and Africa: *Coproporus tachyporoides*, Kr. (vi) Oriental and St Helena: *Philonthus peliomerus*, Kr. (vii) Oriental and Australasian: *Lispinus æqualis*, Fauv., *Diochus punctipennis*, Motsch. (viii) Australasian: *Lispinus castaneus*, Fauv., *Coproporus exul*, Fauv. (ix) Madagascar: *Lispinus obscurellus*, Fauv., *Holotrochus curticollis*, Fauv., *Medon duplicatus*, Fauv., *Medon microthorax*, Fauv., *Gyrophæna plicata*, Fauv. (x) Madagascar and Africa: *Philonthus fimbriolatus*, Er., *Falagria coarcticollis*, Fauv. (xi) Africa: *Edaphus africanus*, Epp., *Aleochara funesta*, Bernh. (xii) Europe (inc. Mediterranean): *Astenus melanarius*, Küst., [also *A. neglectus*, Märk., one specimen doubtfully placed as a variety of this species; and *Conosoma pedicularium*, Grav., of which a new variety, *maheanum*, is described]. (xiii) Very widespread in the Old World: *Lispinus impressicollis*, Motsch., *Oxytelus nitidifrons*, Woll., *Cafius nauticus*, Fairm., *C. corallicola*, Fairm., *Diestota testacea*, Kr., *Atheta dilutipennis*, Motsch., *Aleochara puberula*, Klug. (xiv) Throughout warmer parts of world (or even cosmopolitan): *Ancœus exiguus*, Er., *Oxytelus ferrugineus*, Kr., *Mimogonus fumator*, Fauv., *Medon debilicornis*, Woll., *Philonthus thermarum*, Aubé, *Cœnonica puncticollis*, Kr., *Atheta coriaria*, Kr.

* * * * *

Alluaud in 1893 remarked* on the predominant Indo-Malayan affinities of the Seychelles Coleoptera in general: "en ce qui concerne les Coléoptères, les Séchelles semblent constituer plutôt une limite occidentale de la faune malaise qu'une limite boréale

* Mission scientifique aux Séchelles: considérations générales (*Bull. Soc. ent. France*, 1893, pp. xcvii—xcix).

de la faune malgache; dans tous les cas, elles ne contiennent aucune indication d'une limite orientale de la faune africaine." Fauvel (*op. cit.*) made no general statements as to the relationships of the Staphylinidæ then known from these islands. Kolbe (*op. cit.*) analyses at some length the affinities of the fauna as a whole, and of the Coleoptera in particular: enumerating the endemic element, the large Oriental element, the Madagascar-Mascarene, African, and Afro-Madagascan elements*. As to the Staphylinidæ, he remarks that among the 29 species then known to him, 10 had affinities with the Oriental fauna, 6 with the Madagascan, and 1 with the African; while certain of the remaining species were endemic, and some to be regarded as imported. The increase of the known Staphylinid fauna of the islands from 29 to 81 species not unnaturally modifies to some extent the conclusions based on earlier work. Affinities seem to point in so many directions that the result is somewhat confusing; yet, when certain allowances are made, it may be doubted whether the earlier conclusions need be essentially changed. It is impossible in many cases to say which species have been imported by human agency, which have crossed the ocean by natural means, or which may be relics of past ages when ancient land-connections existed. Our knowledge of the representatives and distribution in surrounding continents of many of the genera—particularly minute forms such as *Atheta* and *Leptusa*—must still be extremely fragmentary†. Many of the known forms, too, are exceedingly widespread. But even when these things are taken into account, the Staphylinid fauna seems to present very considerable Oriental affinities, a rather smaller degree of relationship with Madagascar, and still smaller African and Australasian elements.

* * * * *

It is too soon as yet to summarise the relationships of the whole Coleopterous fauna of the Seychelles as based on the material collected by the Percy Sladen Trust Expedition. Something, however, may be deduced from the families already worked out. The endemic element is sufficiently marked and peculiar. For instance, out of 134 species of Curculionidæ, at least 100 are probably endemic, and one entire section (Phœnicobatina) is so far known only from the Seychelles‡. Raffray§, in his interesting analysis of the Seychellean Pselaphidæ, remarks on their complete lack of resemblance with those of Madagascar—not a single genus of these insects is common to Madagascar and the Seychelles—and their pronounced Indo-Malayan and Austro-Malayan affinities: in the case of six genera out of a total of 12, and 11 species out of 17, one must seek for their morphological affinities in the most eastern countries of Continental Asia, in the Malay Islands, and even as far as the margins of the Pacific. H. Gebien, in his most valuable report on the Tene-

* Kolbe considered also that certain Seychellean forms have relationships with the faunas of Australasia (especially New Zealand) and South America, and discusses the possibility of their having spread northwards from an ancient, circumpolar, Antarctic fauna. In so far as these ideas are based on certain peculiar genera of Seychellean Tenebrionidæ, they must be considerably modified in the light of Gebien's careful study of the Seychelles representatives of that family published later in this volume.

† Reference must be made to Dr Malcolm Cameron's recent work on the Staphylinidæ of the island of Singapore (*Trans. Ent. Soc.* 1918, pp. 58—90, 231—246; 1920, pp. 212—284, 347—413). This work, enumerating 257 species, 146 of which are described as new, should prove a valuable contribution towards our knowledge of Oriental Staphylinids, including the small and obscure forms.

‡ G. C. Champion, *Tr. Linn. Soc. London*, ser. 2, Zool., xvi. p. 393 (1914).

§ A. Raffray, *Tr. Linn. Soc. London*, ser. 2, Zool., xvi. p. 117.

brionidæ (*infra*, p. 261), increases the known Tenebrionid fauna of the Seychelles proper from 12 to over 30 species: of these, 21 are endemic, and 11 of them belong to endemic genera. The endemic genera are extremely isolated and specialised forms showing no connection with any of those of surrounding regions; but the other endemic species, which do not belong to these genera, present almost exclusively Oriental affinities (in certain cases belonging to genera which range as far as the Papuan region or even extend into Australia), and this leaning towards the Orient is increased also by the presence in the Seychelles of certain other species, hitherto regarded as purely Oriental. Gebien finds also a less pronounced Madagascan element in the fauna, but only one typically African species, a widely-distributed form. On the other hand, Schenkling, in his report on the Cleridæ (*infra*, p. 325), finds a very strong liaison with the fauna of Madagascar, 4 out of 6 species showing very close Madagascan affinities, while the two remaining forms are cosmopolitan.

* * * * *

Biological Notes.

The majority of the species—particularly those known only from the islands, and presumably endemic—were found only in the endemic forests which remain uncleared at elevations above 1000 feet. Certain forms, however, occurred at all elevations, from the cultivated lands near sea-level, where the vegetation is almost entirely non-indigenous, far up into the endemic forests: such are *Lispinus specularis*, *L. obscurellus*, and *Medon debilicornis*, none of which insects is peculiar to the Seychelles. *Trogophlœus palustris*, n. sp., was found only on the flat coastal marshes on the narrow plains between the beach and the foot of the mountains at Anse aux Pins and Anse Royale in Mahé—marshes in which the plant-life, again, is for the most part not endemic. The following species were taken only on the beaches of Anonyme Island and Long Island (small coconut-planted islets off the coast of Mahé): *Astenus neglectus*, var. (?), *Scopæus velutinus*, *Medon testaceorufus*, n. sp. (in seaweed), *Cafius nauticus*, and *Cafius corallicola* (in seaweed). Some of these are well-known littoral forms. The habitat of *Stenus silvicola*, n. sp., seems to be somewhat curious; it was one of the characteristic beetles captured by beating foliage in the high mountain-forests—not the foliage of palms and *Pandanus*, but the frequent secondary forest of comparatively small dicotyledonous trees and bushes. Yet the members of this genus are more usually associated with the low vegetation on banks of streams. But the latter are plentiful in the Seychelles forests, and a *Stenus* beaten from trees need not be very far from water.

One specimen (out of a considerable series) of *Conosoma rufiventre*, Fauv., was found in a nest of the ant *Pheidole punctulata*, Mayr, near the coast. Other examples of the beetle occurred in quite different situations, including palm leaf-bases (see below).

Leaf-bases of palms and Pandanus. Most interesting is the number of species taken from between the bases of the leaves of growing endemic palms and screw-pines (*Pandanus*). The writer gave particular attention* to the fauna of this peculiar habitat, which yielded a rich booty. Fourteen species of Staphylinidæ occurred in such situations, sometimes several (as many as four) species in a single palm. None of them, however, was found *exclusively* in this habitat, but all occurred in other places as well—unlike certain

* *Tr. Linn. Soc. London*, ser. 2, Zool., xiv. p. 24 (1910).

Aphodiinæ and Scydmænidæ which were not found elsewhere. Some of the 14 Staphylinids are not even peculiar to the islands, and may be merely chance invaders of the leaf-bases. Others, such as two of the new species of *Leptusa*, and the species of the new genus *Paracyphea*, were found in these places in numbers sufficient to justify their being regarded as a real part of the leaf-base fauna. The following is a list of the fourteen forms: the trees in the leaf-bases of which they were found are indicated as follows: S, R, L signify respectively the palms *Stevensonia*, *Roscheria*, and *Lodoicea* (the "Coco-de-Mer"), while P = *Pandanus*.

Lispinus specularis (S), *L. impressicollis* (S), *Osorius seychellarum* (S), *Edaphus africanus* (S), *Medon testaceomarginatus* (S, P), *M. cephalotes* (S, L, P), *Atanygnathus piceus* (S, P), *Conosoma rufiventre* (S), *Leptusa tropica* (S), *L. longicollis* (S), *Anebolura minutissima* (S), *Paracyphea tenuipunctata* (S), *P. asperata* (S, R, L, P), *P. maheana* (S, P).

It will be seen that all were taken from the palm *Stevensonia*, the most suitable kind for housing a fauna and for investigation by an entomologist. Three species were also found in *Pandanus*, one in both *Pandanus* and *Lodoicea*, and one in all three kinds of palms and in *Pandanus* as well. The occurrence of a beetle in *Roscheria* is noteworthy: this palm usually has no leaf-base fauna, owing to the leaf stalks wrapping so closely one round the other at the base that no room is left for humus or water to accumulate. In *Stevensonia* the leaf-axils contain a fine, damp, slimy, humus. In *Pandanus* they may also contain this, but above it there is usually clear, standing water.

No. IV.—COLEOPTERA: SCYDMÆNIDÆ, SCAPHIDIIDÆ, PHALACRIDÆ, CUCUJIDÆ (SUPPLEMENT), LATHRIDIIDÆ, MYCETOPHAGIDÆ (INCLUDING *PROPALTICUS*), BOSTRYCHIDÆ, LYCTIDÆ.

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(Plates **19—22** and 7 text-figures.)

Read 5th May, 1921.

INTRODUCTION.

The following report constitutes a considerable increase in our knowledge of the fauna of the islands of the Western Indian Ocean. Nearly all the insects were collected by the writer in the mountainous, granitic islands of the **Seychelles** proper. The following is a summary of the material from that Archipelago. Of Scydmænidæ, 15 species, all described as new, are enumerated: previously only one, and that undescribed, had been recorded. Of Scaphidiidæ, seven species, all but one described as new, are recorded: none had been recorded before. Of Phalacridæ, five species, all new, are enumerated: none had hitherto been recorded. Of Lathridiidæ, four species, two being widespread, the other two described as types of new genera: there are no previous records. Of Mycetophagidæ, one cosmopolitan species is recorded, and a new species of the anomalous genus *Propalticus* is described. In Bostrychidæ, four species had been previously recorded from the Seychelles; this number is now increased to seven, but all are very widespread. Of Lyctidæ, one species, the almost world-wide *Lyctus brunneus*, is recorded, as far as I am aware, for the first time.

From **Aldabra**, the only species included in this paper are two widespread forms of Bostrychidæ. No members of any of these families were collected in any of the other coral-islands visited by the expedition, nor do I know of any previous records from those islands.

A large collection made by Mr H. P. Thomasset and Mr H. J. Snell in 1918 in **Rodrigues** Island included two of the species described in this paper: *Scydmænus armatus*, n. sp., and *Nesiotus similis*, n. sp. Both occur also in the Seychelles.

Several new genera have had to be erected: two in Scydmænidæ, one in Scaphidiidæ, one in Phalacridæ, and two in Lathridiidæ.

Nearly all the Seychelles specimens are from the endemic forests at altitudes over 1000 feet. It is probable that a large proportion of the Scydmænids, all or nearly all the Scaphidiids, and some of the Phalacrids, will prove to be themselves endemic, *i.e.* confined to the Seychelles, as regards the species and also in certain cases the genera. The new species of *Propalticus* may also be endemic. Concerning the two new genera of Lathridiidæ, the matter is more doubtful. I have seen a second species of one of these genera from the West Indies, and the Seychelles species may be an imported though hitherto

unknown form. It cannot be said that the representatives of these families, taken by themselves, show a predominant affinity with the fauna of any one region or country. Remarks on the occurrence of particular species in other countries, or the resemblance of Seychellean forms with species known from Madagascar, the Mascarene Islands, the Oriental Region, etc., will be found under the headings of several of the families: so also will remarks on the habitat and local distribution of species within the Seychelles Islands (pp. 198—9, 220, 229, 253, etc.).

Comparison of the number of genera and species known from several groups of islands.

	Scydmænidæ		Scaphidiidæ		Phalacridæ		Lathridiidæ		Mycetophagidæ*		Bostrychidæ		Lyctidæ	
	Genera	Species	Genera	Species	Genera	Species	Genera	Species	Genera	Species	Genera	Species	Genera	Species
Seychelles	5	15	3	7	4	5	4	4	2	2	5	7	1	1
Hawaiian Is.	1†	1	1	1	—	—	2	2	3	3	6	6	1	2
Madeira	2	3	—	—	1	4	6	21	3	4	2	3	1	2
Canary Is.	1	2	—	—	2	5	4	14	2	2	2	3	1	1
Cape Verde Is.	—	—	—	—	3	4	4	7	2	2	2	2	1	3
St Helena	1	1	—	—	—	—	3	4	1	1	1	2	—	—

* Mycetophagidæ: *Propalticus* is included here, and helps to make up the number given for the Hawaiian Islands and the Seychelles. On the other hand, *Mycetæa*, *Symbiotes* and *Myrmecoxenus* are not included: they were included by Wollaston in this family, hence the numbers given above for the Atlantic Islands are smaller than those in Wollaston's Catalogues.

† No Scydmænidæ are recorded from the Hawaiian Islands in "Fauna Hawaiiensis," but *Mastigus spinicornis* (Fabr., = *deustus* Thunb.) is recorded by Csiki (*Col. Cat.* part 70, p. 92, 1919) from those islands and from South Africa.

The sources of information used in compiling the numbers for the other groups of islands are, respectively, "Fauna Hawaiiensis," and for the Atlantic Islands T. V. Wollaston's "Coleoptera Atlantidum" (1865, and supplement, 1867), "Coleoptera Hesperidum" (1867), and "Coleoptera Sanctæ-Helenæ" (1877). In Scydmænidæ and Scaphidiidæ, general catalogues of which have recently appeared (1919 and 1910 respectively), I have searched through these catalogues and added two later-discovered species* to the numbers given by Wollaston. But the table may not be quite up to date: recent discoveries and synonymic changes may have affected the numbers in some cases.

These groups of islands have been selected for comparison because their faunas have been fairly thoroughly investigated and accessible reports on them have been compiled. But too much stress should certainly not be laid on the results of such a comparison. For one thing, the numbers in the table do not discriminate between endemic, and widespread or imported, forms. Thus, in the Hawaiian Islands, practically the whole of the representatives of these families, with the possible exception of the one *Scaphosoma*, are known or thought to be introduced. In the other groups of islands also, several of the Bostrychidæ, Lyctidæ, etc. are widespread forms. Some positive results are, however, forthcoming. The comparative wealth of the Seychelles in Scydmænidæ, Scaphidiidæ, and

* *Cephennium mycetœoides*, Wollaston (1871), from Madeira, and *Euconnus wollastoni*, Waterhouse (1879) from St Helena.

Phalacridæ, as compared with the other archipelagoes, is striking. The total absence of Scydmænidæ (except for one non-endemic species) and of Phalacridæ from the Hawaiian Islands, despite their lofty mountains, luxuriant forests, and fauna so large and so well studied, is especially remarkable. Scydmænidæ are found in decaying wood, humus, etc. (sometimes in ants'-nests) and the Hawaiian forests would seem to be well suited to them. Phalacridæ are (in part, at any rate) flower-haunting beetles. One cannot help noting that the Seychelles are entirely granitic, and probably worn-down remains of an ancient continental land-mass, while the Hawaiian Islands and the other groups are volcanic*.

Another point brought out by the table is the relative abundance of Lathridiidæ in the Atlantic Islands.

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Some other matters of interest referred to in this paper are as follows:

Variability: some remarks on degree of variability are given under Scydmænidæ, p. 198, and under *Parischius seychellensis* (Phalacridæ), p. 235.

Secondary sexual characters affecting the head, the hind femur, and the number of visible ventral abdominal segments are described under Scydmænidæ, pp. 199, 201 sqq., 209: a heteromerous condition of the tarsi in the ♂ only is described under Phalacridæ, pp. 231, 238.

Anatomical points. The condition of the hind wings is remarked on under Scydmænidæ (p. 199), Phalacridæ (p. 231), and *Propalticus* (p. 254). The minute structure of the antennæ is discussed under Scaphidiidæ (pp. 221—9), Phalacridæ (p. 230), and *Propalticus* (p. 254). Curious parallel striations on the third segment of the antennæ are described under *Propalticus* (p. 254) and *Ostomopsis* (p. 251). Detailed structure of tarsi (including heteromery) is described in Phalacridæ (p. 231), and that of sterna under the various new genera, and especially under *Scydmænus* (pp. 207—8), *Toxidium* (pp. 226—7), Phalacridæ (p. 231). An anomalous Cucujid with heteromerous tarsi is described, p. 243.

Myrmecophily. The occurrence of a Scaphidiid in an ants'-nest is recorded, pp. 221, 225.

Fauna of leaf-bases of palms and *Pandanus* is added to under Scydmænidæ, pp. 199—200.

Occurrence in fungi of three species of *Scaphosoma* indicates that the habits of these insects are similar to those of their congeners in other countries.

Attraction to light, and probable **boring in wood of mangrove** (*Ceriops*); see under *Apate congener*, p. 258.

* * * * * * * * *

Types. A first set, including the *types* of all new forms, will be placed in the British Museum: a second series will be kept in the Cambridge University Museum.

Acknowledgments for kind help are due particularly to Dr Sharp, to Mr G. J. Arrow and Mr G. C. Champion, Monsieur P. Lesne, Monsieur J. Achard, and Dr K. Holdhaus.

* On the other hand Scydmænidæ are present in volcanic—though much less remotely isolated—islands in the West Indies. The writer has seen unstudied material from St Vincent and Grenada in the British Museum. [It may be added that Scydmænidæ are recorded from St Thomas, Porto Rico, and Cuba—these are not all volcanic—in *Bull. Amer. Mus. Nat. Hist.* 33, article 30, pp. 391—493, 1914.]

SYSTEMATIC ACCOUNT.

Scydmænidæ.

The collection contains 15 species of this family, belonging to five genera. The whole material was collected by the writer in the mountainous, granitic islands of the Seychelles proper, and (as will be shown below) almost exclusively among the purely endemic vegetation of the native forests, at considerable elevations. All the species and two of the genera are described as new to science. No Scydmænid has hitherto been described from the Seychelles, though Alluaud recorded finding an undetermined species of *Scydmænus* there in 1892 (*Bull. Soc. ent. France*, 1893, p. 98; Kolbe, *Mitt. Zool. Mus. Berlin*, 5. 1910, p. 21): this was probably *Scydmænus armatus*, sp. n., a widely distributed Mascarene and Oriental form, and the only one of the 15 species known from outside the Seychelles.

Affinities. Of the five genera, *Cephennium* is represented by a single highly peculiar species, from the drier type of forest, at a lower level, on Félicité Island. Csiki* catalogues 6 subgenera and 94 species of this genus, which is known to occur in the Palæarctic, Nearctic, Ethiopian and Oriental Regions, though the great majority of described species are Palæarctic, and it would be rash to predict how many forms of these minute creatures may await discovery in other parts of the world.

Neseuthia, a new genus allied to *Cephennium* and to *Euthia*, is represented by seven quite distinct species. It is possibly related to *Cephennomicrus*, a genus described from a single specimen from East Africa (see below, p. 202).

Scydmænus, a large and world-wide genus (229 species catalogued by Csiki) is represented by four species, belonging to at least two, if not more, distinct subgenera. One of these forms, *S. armatus*, sp. n., is the only one of all the 15 Scydmænids known from outside the Seychelles, being found in Mauritius and Rodrigues, Penang and Borneo: as might be expected, it is in the Seychelles not confined to the forest, but was taken also in cultivated places and at sea-level. As to the affinities of the other species, but little can be said in the present state of knowledge of this great complex: but it is noteworthy that one peculiar species, *S. lodoiceæ*, sp. n., has a nearly related form in the West Australian *S. optatus*, Sharp †.

Stenichnoteras, a new genus of bizarre form, is known only from a single species.

Euconnus: to this great and world-wide genus, 13 subgenera and 430 species of which are catalogued by Csiki, are referred two species, one of which especially is a highly remarkable insect. Ultimately they may have to be placed in a new genus, or at least in a distinct section of *Euconnus*.

Variability. Though eight of the 15 species are represented by considerable series, the amount of variation is not remarkable. Even among the seven species of the genus *Neseuthia*, there are no "intermediates," and no difficulty has arisen in separating species. This con-

* E. Csiki, Scydmænidæ; *Coleopt. Catalogus* (Junk & Schenkling), part 70, xii. 1919.

† For the sake of comparison, attention may be drawn to the affinities of the Seychelles Pselaphidæ. These affinities must be sought in the most eastern confines of Continental Asia, and in the Malay Archipelago, even as far as the borders of the Pacific. The strong affinity of the Seychellean Pselaphids with forms found in these lands, and their total isolation from the fauna of Madagascar, are forcibly brought out by Raffray in the interesting Introduction to his paper, *Trans. Linn. Soc. London*, Ser. 2, Zool., xvi. pp. 121—2, 1913.

dition is only like that found among practically all the groups of Seychelles Coleoptera hitherto studied and serves to illustrate again the contrast between the Seychellean fauna and that of the Hawaiian Islands. In the Seychelles, many genera are represented, frequently by one or few species, and the species are all distinct: in the Hawaiian Islands whole groups of genera are absent, but some of those which are present—and which are frequently endemic—contain long series of species, many of which are extremely difficult to separate one from the other.

Secondary Sexual Characters. These are remarkably developed in the head of *Neseuthia*, and in the hind femora of *Scydmænus armatus*. The long spur of the middle tibia of *Cephennium felicitas*, and the teeth on the front femora of *Scydmænus lodoiceæ*, may also perhaps be sexual features.

Hind Wings. No instance of reduction or abortion of the hind wings has been observed. In *Cephennium felicitas* and in four of the species of *Neseuthia* they were not examined, owing to paucity of material. But in *Neseuthia typica*, *N. minor*, and *N. cornuta*, specimens were examined, and the wings were found to be fully developed, much longer than the elytra. Such is also the case in all four species of *Scydmænus* and in *Euconnus senex*. In *Stenichnoteras* and in *Euconnus seychellensis* they were not examined. Ganglbauer (*Käf. Mitteleur.* iii. 1899, p. 5) states that the hind wings of Scydmænidæ are often rudimentary or quite absent.

Habitat and local distribution of the Seychelles species. As already remarked, the Scydmænidæ were with few exceptions taken in the endemic forests at high elevations. The most noticeable exception is the non-endemic *Scydmænus armatus*, which was found both in and outside of the forests, at high and at low elevations. Certain other species, which there is every reason to suppose are peculiar to the Seychelles, were not found exclusively in the very damp type of forest at heights above 1000 feet (*i.e.* in Mahé and Silhouette), but occurred also in the Coco-de-Mer (*Lodoicea*) forest in Praslin, and in the drier type of forest, little above sea-level, on Félicité. This Félicité forest, though a perfectly natural type, contains a considerable proportion of trees not confined to the Seychelles, but growing also on the coasts of other islands in this region. From Félicité came the unique example of *Cephennium felicitas*, and one of the specimens of *Neseuthia perexigua*: from Praslin, the whole material of *Scydmænus lodoiceæ*, and several examples of *Scydmænus insularum* and of *Euconnus seychellensis*. The high mountain-forests of Mahé and Silhouette provided all the remainder.

Though some Scydmænidæ occur regularly in ants'-nests, and though the appearance of some of mine would suggest myrmecophily or termitophily, I have no record or evidence of either phase of life in connection with any of the Seychellean Scydmænids. Some examples were taken in rotting wood, others among damp, rotting leaves on the ground*. The list of the fauna found between the leaf-bases of growing endemic palms—a fauna

* Monsieur Raffray, in his Introduction to the Pselaphidæ of the Seychelles (*t. c.*, p. 121), remarks that the employment of a sieve would probably have caused a larger material of Pselaphids and other small endogæous insects to be obtained. Such a statement may be taken to apply to the Scydmænidæ *inter alia*. With all respect to Mons. Raffray's wide tropical experience, it may be said, however, that sifting dead leaves and other vegetable detritus in the Seychelles forests is not an easy operation. The great size and tough, leathery consistency of many of the leaves, and the extreme dampness and stickiness of the humus, render it very difficult to make anything pass through a sieve. For this reason I scarcely used a sieve at all, but found the careful turning over of débris on a white beating-tray, or the tearing apart of the fibres of thick, decaying leaf-stalks, etc., more profitable.

which has already proved extensive and interesting—is further increased. All the examples of *Scydmænus lodoiceæ*, and some at least of *Euconnus seychellensis*, *Neseuthia minor*, and *N. polita* were taken in such situations. The finding of a specimen of *Euconnus senex* drowned in a pitcher of *Nepenthes* is also interesting.

Cepheniini.

CEPHENNIUM, Müll. and Kunze.

The collection contains only a single specimen referable to this genus. It agrees with typical species of *Cephennium* in all structural points, though it presents the remarkable feature of possessing a long, fine, curved spine or *spur* (Pl. **19**, fig. 1*a*), nearly as long as the tarsus, at the apex of the middle tibia. This curious appendage is exactly the same in the right middle leg as in the left, while the two front and two hind legs show no trace of such a structure. Another point is the presence of erect *setæ*, quite distinct from the ordinary hairs, at the hind angles of the prothorax and on the sides of the elytra. But I have not thought fit to erect a separate genus on these grounds: the more so, as the long tibial spur may be a secondary sexual character. The specimen being unique, it has not been possible to determine its sex.

A similar long, slender, filiform spur occurs on the *hind* tibiæ of both sexes in the Pselaphid *Batraxis egregia*, Raffray, a species known only from the Seychelles: and Raffray remarks that the nearest known relative of *B. egregia*, namely *B. indica*, Raffray (India), is without this spur (Raffray, *Trans. Linn. Soc. London*, Ser. 2, Zool., xvi. p. 132, and Pl. 10, fig. 10, 1913).

1. *Cephennium felicitas*, sp. n.

(Plate **19**, figs. 1, 1*a*.)

Sat latum, convexum, modice politum, rufescens, subtilissime punctulatum ac pilosum; prothorace valde transverso, lateribus antice arcuatis, ad basin parum angustato, lateribus (desuper visis) haud sinuatis, angulis posticis obtusis sed apice haud rotundatis, foveolis 2 ante basin subobsoletis, setâ erectâ utrinque in angulo postico: elytris medio haud fortiter ampliatis, elytro utroque in latere setis 2 erectis instructo, 1° ad humerum approximato, 2° ad $\frac{2}{3}$ longitudinis, plicâ subhumerali conspicuâ, elongatâ: tibiâ mediâ spinâ arcuatâ, tenui, acutâ, longitudinem tarsi fere attingente, in apice instructâ. Long. corp. 0·7 mm.

Rather short and broad, moderately convex (prothorax and elytra, seen from the side, separately convex), moderately shining, reddish-brown, darker at the extreme base of prothorax and elytra, legs and antennæ yellowish, clubs of the latter not darkened. *Head* finely punctured. *Eyes* normal. *Prothorax* strongly transverse, sides rounded in front and front angles deflexed, narrowed towards the base, hind angles obtuse but not rounded off at the apex, side margins (seen under a high power) crenate, not sinuate when viewed from above; disc convex, extremely finely punctured and with very fine, short, pale hairs, the punctures separated by two or more times their own diameter; a single seta of moderate length rises on either side just in front of the hind angle; a group of stronger punctures on either side near the hind angle, and two not very marked foveoles quite close to the base. *Scutellum* rather broad, apex rounded. *Elytra* not conspicuously broadened, broadest

about the middle, covering the entire abdomen, rather strongly deflexed at the sides before the apex, where they are separately rounded (the separate curvature of their apical margins is not indicated in the figure, owing to the deflexion of the hind end); each with 2 outstanding setæ of moderate length at the side, one just behind the shoulder, the other at about $\frac{2}{3}$ the length; and each with a marked and rather long subhumeral fold; surface finely punctured, the punctures separated by two or more times their own diameter, and bearing very fine, short, pale hairs. *Wings* not examined. Front and hind *legs* normal. The tibia of the *middle leg* (Pl. **19**, fig. 1*a*) bears, in addition to a short blunt spine at the heel of its apex, a long, curved, finely pointed spine, nearly as long as the tarsus, and arising from the posterior side of the apex of the tibia.

Loc. Seychelles. Félicité Island: from forest, 14—17. xii. 1908, one example.

Neseuthia*, gen. nov.

Forma suboblonga, haud valde convexa. Caput sat latum, sed prothorace distincte angustius; in ♂ vel foveolis vel tuberculis antice munitum. Antennæ 11-segmentatæ, segmentis 3°—8° longitudine diversis sed omnibus longioribus quam latioribus, segmento 9° inflato, inter funiculum et clavam transeunte, segmentis 10° et 11° clavam sat laxam formantibus. Prothorax maximâ elytrorum latitudine parum angustior, transversus, lateribus antice fortiter rotundatis, angulis anticis valde deflexis, desuper haud visibilibus; ad basin angustatus, angulis posticis obtusis vel fere rectis; foveolis 2, 4, vel 5 ante basin, sulco transverso coniunctis, instructus. Scutellum sat latum et curtum. Elytra ad medium plus minusve ampliata, abdomen (apice extremo excepto) obtegentia, apice separatim late rotundato-truncata. Alæ perfectæ. Prosternum breve, in processum angustum inter coxas anticas productum. Mesosternum aream pentagonalem, marginatam, carinâ mediâ longitudinali elevatâ munitam formans: basi truncatâ huius laminæ cum metasterno haud in plano coniunctâ, sed super hoc elevatâ. Metasternum convexum, læve; suturis inter hoc et episterna haud visibilibus. Abdomen subtus segmentis 6 in ♂, 5 in ♀, instructum. Coxæ anticæ approximatæ, a processu prosternali anguste separatæ: coxæ intermediæ et posticæ sat distantes. Trochanteres postici haud elongati. Tarsi filiformes, 5-articulati.

General *form* rather short and broad, not very strongly convex. *Surface* above usually more or less densely punctate, extremely finely and shortly pilose. *Head* rather broad, but considerably narrower than the prothorax: in all species the ♂ of which is known the frons in this sex bears impressions or elevations (or both) of remarkable form, quite distinct in each species; in the ♀ it is even. *Eyes* rather prominent, extending more on to the ventral than the dorsal surface. *Antennæ* 11-segmented, segments 1 and 2 large, 3—8 slender and all longer than broad; 3 is rather short, 4—6 longer and nearly equal in length, 7 slightly longer than 6 or 8, 8 nearly equal to 6; 9 slightly inflated, forming a transition between the segments of the funicle and those of the club, so that it is hard to say whether the latter should be regarded as 2- or 3-segmented (in *Neseuthia crenata* it is rather more abruptly 2-segmented); 10 and 11 are inflated club-segments, 10 being subrotund and 11 much longer and narrowing to its apex. *Maxillary palpi* with basal segment minute, segment 2 rather long and slender, 3 long and dilated, 4 minute, almost completely fused with 3, with which it is continuous in outline, forming a bluntly rounded apex. *Labial*

* νῆσος, an island, and *Euthia*.

palpi with segments 1 and 2 short, closely compacted, 3 slender and pointed, slightly oblique to 1 and 2. *Mentum* transverse, subquadrate. *Prothorax* very little narrower than elytra, transverse, subrectangular, more or less broadened in front, but with front angles strongly deflexed, so that when viewed from above they appear quite rounded off: the sides are usually more or less sinuate and finely margined, and there are 2, 4, or sometimes 5 foveoles (usually connected by a transverse furrow or depression) before the base. *Scutellum* rather broad and short. *Elytra* covering the entire abdomen except the extreme apex of the pygidium (which is visible from behind), apices subtruncate and separately curved: at the base each elytron has a slight subhumeral fold, and usually a basal depression between this and the scutellum. *Wings* fully developed. *Prosternum* in front of the coxæ short; a narrow, tapering *prosternal process* runs back between the coxæ, its apex lying over (*i.e.* ventral to) the anterior extremity of the mesosternum. *Mesosternum* much as in *Euthia*; forming a roughly pentagonal, margined plate, with a median longitudinal elevated keel; the apex of the pentagon is directed forwards, and its truncate basal margin is not continuous with the surface of the front of the metasternum, but is elevated above (*i.e.* ventral to) the latter. *Metasternum* convex: sutures between it and the episterna are not visible (cf. under *Scydmænus*, p. 207); between the hind coxæ it is truncate and its angles form minute processes. *Abdomen* ventrally 6-segmented in ♂, 5-segmented in ♀; basal segment in the middle nearly as long as the two following together; intermediate segments short, about equal in length; terminal segment as long as the two preceding together, with rounded or half-elliptic margin. *Front coxæ* close, but not contiguous, separated by the prosternal process: *middle* and *hind coxæ* about equally distant. *Posterior trochanters* not appreciably longer than the middle pair. *Femora* rather long, dilated distally. *Tibiæ* long and slender. *Tarsi* 5-jointed, filiform.

Type of the genus: *Neseuthia typica*, sp. n.

This genus resembles *Euthia* in possessing a series of impressions across the base of the prothorax and in the form of the mesosternum. But in the length of its elytra it is nearer *Cephennium*. In reality however it is quite distinct from either, in general form, in possessing an elevated, acuminate, prosternal process separating the front coxæ, and in the remarkable characters of the head in the ♂. The antennæ also are different, being slenderer, and gradually dilated apically: the club should probably be regarded as 2-segmented, though, as stated above, in most species segment 9 is transitional between funicle and club.

I have not been able to see the unique type of the genus *Cephennomicrus*, Reitter, described by Reitter from East Africa as *C. perpunctillum* (*Wien. Ent. Zeit.*, 26, 1907, p. 297). Judging from the description it agrees with *Neseuthia* in several respects. Examples of *Neseuthia* were submitted to Dr Karl Holdhaus, of the Vienna Museum, who kindly compared them with the type of *Cephennomicrus*, now in that Museum. He states that *Cephennomicrus* has four foveoles in front of the base of the prothorax, but no transverse furrow connecting them, whereas this basal furrow is present in all the following species of *Neseuthia*, though ill-defined in two of them. Dr Holdhaus also reports that *Cephennomicrus* has a very large 2-segmented antennal club, which is not the case in *Neseuthia*. He was not able to study the underside of *Cephennomicrus*, neither does Reitter make any mention of a prosternal process or of the form of the sterna.

The seven forms described below are all quite distinct, so that in no case have I had any hesitation in assigning any specimen to its specific position. *N. typica* and *N. minor* are represented by considerable series of examples, but no marked variation has been noted. The remaining five species are represented only by single specimens or twos; in many cases one would hesitate to name and describe species on such small material, but in this instance I have felt no doubts, the insects being so clearly different. Three are known only in the male sex, and one only in the female; but the latter is so entirely different from any of the former, that it can hardly be the female sex of any one of them.

2. *Neseuthia typica*, sp. n.

(Plate **19**, figs. 3, 3 *a*.)

Lata; prothorace valde transverso, lateribus (desuper visis) haud fortiter sinuatis, angulis posticis obtusis, rotundatis, disco foveolis 5 ante basin sulco transverso coniunctis; capite prothoraceque subtilissime punctatis, inter puncta lævibus, elytris fortius punctatis, rugulosis. ♂ capite foveolis 2 profundis inter oculos, antice late producto, truncato: ♀ capite levissime biimpresso. Long. corp. 0·9 mm.

Form broad; moderately shining, pitchy-reddish, elytra darker, legs and antennæ paler, terminal joint of the latter infuscate; pilosity very fine, very short, pale. Prothorax markedly broader than long, the sides (viewed from above) very little sinuate, the front angles (only visible in side view) a little less than right angles, rounded off at the apex, hind angles obtuse and rounded off; 5 foveoles in front of the base united by a continuous shallow depression across the disc. Head and prothorax extremely finely punctured, the surface between the punctures quite smooth, the punctures on the prothorax separated by several times their own diameter. Elytra very much more coarsely punctured, and having a closely rugulose appearance.

♂. Head (Plate **19**, fig. 3 *a*) with two deep impressions between the eyes, the surface in these impressions being very shining and without punctures or hairs. In front of these foveoles the head projects broadly, the projection being truncate or slightly concave in outline, and rendering it hard to see the epistome from above.

♀. Head with two very shallow, oblique depressions, converging in front, sometimes scarcely perceptible.

18 ♂, 11 ♀.

Loc. Seychelles. Mahé, Silhouette. Mahé: Cascade Estate, 800—1500 feet; scrubby forest vegetation on top of Mount Sebert, nearly 2000 feet; Mare aux Cochons district, about 1500 feet. Silhouette: a single ♀, from among dead leaves, mostly decaying palm leaf-bases, in a very damp, shady place in the forest, at 1500 feet or more, 15. viii. 1908.

3. *Neseuthia minor*, sp. n.

(Plate **19**, figs. 4, 4 *a*.)

Minor, minus lata, pilis longioribus; prothorace minus fortiter transverso, lateribus (desuper visis) magis sinuatis, angulis posticis obtusis, late rotundatis, disco foveolis 4 ante basin sulco transverso coniunctis; prothorace subtiliter (densius quam in *N. typicâ*) punctato, elytris dense ac fortius punctatis, rugulosis. ♂, capite foveolis 2 profundis, magis

inter se distantibus, antice late producto, truncato, lateribus partis productæ parum elevatis: ♀, capite lævi. Long. corp. 0·8 mm.

Smaller and narrower in proportion than *N. typica*. Surface but little shining; head, prothorax, legs and antennæ yellowish (the last with club infuscate), elytra very much darker, almost blackish; hairs pale, but longer and closer than in *N. typica*. Prothorax transverse, but less wide in proportion to its length, sides (seen from above) more sinuate before the hind angles, the front angles (only visible in side view) distinctly acute but rounded off at the apex, hind angles obtuse and widely rounded off at the apex; only 4 distinct foveoles are visible before the base, the middle one being obsolete, but a transverse depression unites those on either side across the wide median interval. Prothorax finely punctured, but decidedly more closely than in *N. typica*; elytra closely and more strongly punctured, rugulose.

♂. Head (Plate **19**, fig. 4 *a*) with two deep shining impressions between the eyes, but these impressions are much further apart than in *N. typica*, and lie obliquely, converging in front: immediately within the front extremity of each is a minute puncture-like impression. In front the head is produced into a broad, truncate projection, each side of which is very slightly raised into a ridge running almost vertically down the front towards the epistome.

♀. Head without elevations or impressions.

14 ♂, 14 ♀.

Loc. Seychelles. Mahé, Silhouette. Mahé: forest near Morne Blanc, xi. 1908; Cascade Estate, 800—1500 feet; forest behind Trois Frères, about 2000 feet, 14. i. 1909. Silhouette: forest near Mont Pot-à-eau, over 1000 feet, 1 ♂; also 1 ♀ from between leaf-bases of a growing *Stevensonia*-palm, at over 1500 feet, 7. viii. 1908.

4. *Neseuthia cordithorax*, sp. n.

(Plate **19**, fig. 2.)

Forma valde distincta, prothorace ad basin valde angustato et lateribus fortius sinuatis, elytris ante medium valde ampliatis. Polita, pilis parcis, brevissimis; prothorace parum latiore quam longiore, angulis posticis obtusis sed minus rotundatis, foveolis 4 ante basin (sulco transverso coniunctis), externis ad angulos valde approximatis: prothorace parce subtilissime punctato; elytris fortius punctatis, vix rugulosis, utroque plicâ subhumerali et foveolâ basali conspicuis. ♂, capite foveolis 2 inter se approximatis, antice sat late producto, partis productæ angulis lateralibus rotundatis. Long. corp. fere 0·8 mm.

General form characterised by the marked sinuation of the sides of the prothorax before the hind angles, and the great broadening of the elytra before the middle, which give the insect a distinctly "waisted" appearance. Strongly shining, dark pitchy, head rufescent, antennæ and legs yellowish, the pale hairs very sparse and extremely short. The prothorax is but little broader than long; the marked sinuation of its sides before the base has been already referred to; front angles (only visible in side view) much as in the preceding species, hind angles obtuse, much less rounded off at the apex than in *N. minor*; there are only 4 foveoles (connected by a transverse depression) before the base, the median (fifth) one being obsolete; the outer one on either side is very close to the hind angle, and

a short seta rises from it, and another one from the side margin of the prothorax just before the hind angle. Prothorax extremely finely punctured, the punctures separated by several times their own diameter. Elytra with the subhumeral fold, and the basal depression between it and the scutellum, very marked; more strongly punctured than the prothorax, but the rugulosity is very slight and the surface highly polished.

♂. Head with two shining impressions close together between the eyes; broadly produced in front, but with the produced part less sharply marked off from the rest of the head, its lateral angles rounded off and passing more gradually into the lateral portions of the head.

Described from a single ♂, which however is so distinct from the other forms that I name it without hesitation.

Loc. Seychelles. Silhouette: forest near Mare aux Cochons plateau, about 1000 feet, viii. 1908.

5. *Neseuthia perexigua*, sp. n.

(Plate **19**, figs. 5, 5 *a*.)

Minutissima, sat angusta, dense subtiliter punctulata, pilis parum longioribus: prothorace paullum latiore quam longiore, lateribus levius sinuatis, angulis posticis fere rectis, haud fortiter rotundatis, foveolis 4 ante basin sulco transverso coniunctis: elytro utroque basi foveolis 2 fortibus sed haud elongatis, disco subruguloso. ♂, capite haud impresso sed antice medio parum producto, parte productâ haud punctatâ, glabrâ. Long. corp. 0·6 mm.

Very minute, rather narrow, surface not strongly shining, densely punctured, with the fine, pale hairs rather long: pitchy brownish, head and prothorax paler, legs and antennæ yellowish, the club of the latter not infuscate. *Antennæ* short, little longer than head and prothorax together. *Prothorax* but little broader than long, the sides (seen from above) very little sinuate, front angles (only visible in side view) acute, rounded off, hind angles (viewed from above) little wider than right angles, not much rounded at the apex; the foveoles before the base are 4 in number, and connected by a transverse depression, which is curved slightly forwards between the middle two. Head and prothorax finely and closely punctured, but the punctures are separated by more than their own diameter. Elytra each with 2 marked but not prolonged basal impressions, the disc closely punctured and faintly rugulose.

♂. Head (Plate **19**, fig. 5 *a*) without impressions, but very slightly produced in the middle, the produced portion impunctate and without pubescence.

♀. Head not produced, evenly punctate and pubescent throughout.

A single ♂ and ♀, very distinct from any other species.

Loc. Seychelles. Mahé, Félicité. Mahé, from near Morne Blanc, ♂. Félicité, from forest, xii. 1908, ♀.

6. *Neseuthia cornuta*, sp. n.

(Plate **19**, figs. 8, 8 *a*.)

♂. Capite inter oculos profunde biimpresso, antice in tuberculos 2 acutos dentiformes producto: prothorace distincte latiore quam longiore, lateribus (desuper visis) vix sinuatis, angulis posticis fere rectis, apice vix rotundatis, foveolis ante basin 4 sulco transverso haud

definito coniunctis, disco dense subtiliter punctato: elytris dense rugulose punctatis. Long. corp. fere 0·9 mm.*

A single ♂, in a fragmentary condition, the elytra and abdomen being detached from one another and from the fore-parts of the body, so that a description of the insect as a whole is impossible, though each part can be described by itself. Dark brown, head rufescent, legs and antennæ yellowish, the terminal club-segment of the last infuscate. The form of the head is so different from that of any other species, that this alone is sufficient warrant for the naming and description of the insect. The *head* (which is pulled out to an unnatural extent from the prothorax, see fig. 8) has two deep shining impressions filling most of the space between the eyes, separated only by a narrow elevation, which does not extend quite to the front of the cavities: each cavity seems to have the form of a trough, angular in section, so that the deepest part, between the front and back slopes of the trough, appears as a transverse line: the top of the head is produced in front into two sharp tooth-like prominences: behind the impressions the surface is excessively finely punctured. *Prothorax* distinctly broader than long, sides only very feebly sinuate, hind angles little wider than right angles, not (or scarcely) rounded off at the apex; the foveoles before the base 4 in number, connected by a rather ill-defined transverse depression, which is not shown in fig. 8; surface finely and closely punctured, but the punctures are separated by more than their own diameter. *Elytra* closely and rugosely punctured, the pale hairs close but very short.

Loc. Seychelles. Mahé: Cascade Estate, 800 feet or more.

7. *Neseuthia polita*, sp. n.

(Plate **19**, figs. 6, 6 *a*.)

♂. Sat lata, impunctata, fere glabra, fortiter polita, picea; prothorace distincte latiore quam longiore, lateribus haud sinuatis, angulis posticis obtusis, haud apice rotundatis, margine ad angulos posticos distincte latiore, foveolis 5 ante basin sulco transverso coniunctis; elytro utroque impressione basali inter plicam et scutellum haud conspicuâ: capite tuberculis 2 minutis medio paullum ante oculos, et parte inferiore frontis utrinque tuberculis aliis 3 minutis instructo. Long. corp. fere 0·74 mm.

Form rather broad: dark pitchy brownish, legs and antennæ dusky yellowish, the terminal and the penultimate segment of each antenna being infuscate: surface highly polished, the pale hairs excessively short and very widely spaced, so that at first sight the insect appears glabrous and impunctate. *Antennæ* relatively short. *Prothorax* distinctly broader than long, sides (seen from above) practically not sinuate at all; hind angles obtuse but not rounded off at the apex, while the margin becomes broad and conspicuous just at the angles; foveoles before the base 5 in number, the median and the two outer placed a little further forward than the others, connected by a transverse depression. Elytra with basal impression between the subhumeral fold and the scutellum very inconspicuous. Punctuation practically obsolete.

Head (Plate **19**, fig. 6 *a*) with 2 very minute tubercular elevations in the middle a

* Since the insect is in pieces, this measurement was arrived at by adding together separate measurements of the head, prothorax, and elytra.

little in front of the eyes, separated from the eyes on either side by about twice the distance which separates the elevations from one another: and with 3 other such elevations on either side, one above the other, on the part of the head between and above the bases of the antennæ.

Loc. Seychelles. Silhouette: from between leaf-bases of a growing *Stevensonia*-palm in the forest above Mare aux Cochons, 22. ix. 1908, 1 ♂.

8. *Neseuthia crenata*, sp. n.

(Plate **19**, fig. 7.)

♀. Sat magna, conspicue lata, polita, picea, prothorace utrinque ante angulum posticum maculâ obscure rufescente, antennis nigrescentibus, pedibus flavis: prothorace valde latiore quam longiore, lateribus haud sinuatis, sed ante angulos posticos sat late explanatis et marginibus crenulato-serratis, foveolis ante basin 2 sulco transverso fere obsoleto coniunctis: scutello ad basin concavo: elytris plicâ subhumerali conspicuâ, disco inter puncta lævi. Long. corp. fere 0·86 mm.

A larger, conspicuously broad, form; shining pitchy black, with a translucent rufous spot on either side of the prothorax about $\frac{1}{3}$ of its length from the base, legs yellowish, antennæ blackish except the two basal segments, which are dusky yellowish. The pale hairs are widely spaced and very short. *Head* finely punctured. *Antennæ* relatively short, with the club rather more abruptly 2-segmented than in the other species. *Prothorax* much broader than long, the sides not sinuate, the hind angles right angles, not rounded off at the apex; sides rather broadly explanate and with the margin crenulate-serrate in front of the hind angles; foveoles before the base only 2 in number, placed at some distance from the angles and connected by a vague transverse depression; disc very finely punctured, the punctures separated by several times their own diameter, and a group of larger ones on either side at the base, just inside the explanate margin. *Scutellum* impressed and concave at its base. *Elytra* with conspicuous subhumeral fold, and with punctuation widely spaced (as on the prothorax), the surface between the punctures smooth and polished.

Described from two females, which are entirely distinct from any of the other forms.

Loc. Seychelles. Mahé: from near Morne Blanc, x—xi. 1908; forest between Trois Frères and Morne Seychellois, 1500—2000 feet, xii. 1908.

Scydmænini.

Scydmænus, Latr.

The collection contains four species of this genus. The first (*S. armatus*) seems to fall into the subgenus *Scydmænus, s. str.*; while the subgeneric position of the following two is doubtful, and the fourth (*S. lodoiceæ*) belongs to the subgenus *Heterognathus*, King. They are so placed rather tentatively, since the limits of the subgenera do not seem to be clearly made out, as will appear below.

One structural character which has not (to my knowledge) been used in classifying these insects, but which sometimes clearly separates species that are superficially alike, is the presence or absence of sutures on either side of the metasternum, running from the outer edge of the middle coxal cavity to that of the hind coxal cavity, and usually curving

outwards slightly in their course (Pl. **22**, figs. 31*a*, 32*a*). These sutures, which I take to be the sutures separating the metasternum from the meta-episterna, are, in some species at any rate, marked by a line of blackish pigment, and by a deep groove or furrow running immediately outside this. In some species they are very easily visible, even with a strong hand-lens. In other species they are entirely absent, no trace of them being discernible even with the most careful examination under a compound microscope. The explanation suggested itself, that possibly in these latter species the sutures are pushed so far outwards and upwards as to be hidden under the margin of the elytra. But in specimens with elytra opened or removed, so that the pleural region can be examined, no evidence of the truth of this suggested explanation has been found, while there is, just outside the posterior coxal cavity on either side, a slight indication of a commencing suture, all the rest of which is obliterated. Whatever be the exact morphological explanation, the presence or absence of these sutures may at least have some systematic value*.

Ganglbauer (*Käf. Mitteleur.* iii. 1899, p. 56) gives as a character of the whole group *Scydmænini* that the metasternum is throughout its whole length separated from the margins of the elytra by its episterna: but in the species which lack these sutures, no separation between the metasternum and its episterna is visible. The obliteration of the metasterno-episternal sutures may prove to be a character of the subgenus *Heterognathus*†, though not of all species hitherto included in it. The sutures are quite obliterated in a co-type of one of King's original species which I have examined, namely *Heterognathus assimilis*, King (Australia): they are also absent in the West Australian *Scydmænus optatus*, Sharp, and in an undetermined species (in the British Museum) near it; in the European *S. rufus*, Müll. K., referred by Reitter (*Fauna Germanica*, ii. p. 228) to the subgenus *Heterognathus*; and in two of the new species (*S. insularum* and *S. lodoiceæ*) described below. On the other hand they are present in the Australian *Heterognathus robustus*, Lea (co-type examined), which should probably be assigned to subgenus *Scydmænus*, *s. str.*, and in the European *S. hellwigi*, Herbst, referred by Reitter (*l.c.*) to subgenus *Heterognathus*.

On the other hand, the presence of these sutures may prove to be a feature of subgenus *Scydmænus*, *s. str.* They are present in the European *Scydmænus* (*s. str.*) *tarsatus*, Müll.; in two new species described below (*S. armatus* and *S. seychellensis*); and in certain other forms, both determined and undetermined, which I have seen.

The occurrence of the spine on the hind femur of the ♂ in *S. armatus*, and of the teeth on the front femur in *S. lodoiceæ* (possibly also a ♂ character), is noteworthy.

9. *Scydmænus armatus*, sp. n.

(Plate **19**, figs. 9, 9*a*.)

Robustus, haud fortiter nitens, rufo-flavus, pilis pallide aureis sat dense vestitus, his in capite et in prothorace decumbentibus, in elytris parum elevatis: antennis sat crassis, clavam versus gradatim incrassatis: capite magno, prothorace parum angustiore, transverso, subrectangulari, antrorsum parum angustato, angulis posticis rotundatis: prothorace maximâ

* Compare the partial obliteration of the metasterno-episternal sutures in *Toxidium seychellense* (Scaphidiidæ, pp. 226—7).

† *Heterognathus*, King, Reitter (*Fauna Germanica*, Käfer, ii. 1909, p. 228) = *Cholerus*, Thoms., Ganglbauer (*t. c.* p. 57).

latitudine ad $\frac{1}{3}$ longitudinis, basin versus angustato, foveolis 4 ante basin munito: scutello celato: elytris regulariter ampliatis, apice rotundato-truncatis, utroque basi in medio sat depresso, fortius punctatis: mesosterno inter coxas medias laminam elevatam, angustissimam, antice parum dilatatam, formante: suturis inter metasternum et episterna distinctis, sulcatis: pedibus robustis, pilosis: ♂, tarsis anticis latioribus, femore postico utroque ad basin postice spinâ forti, acutâ, instructo. Long. corp. 1·6 mm.

A rather stoutly built species, not very convex, only feebly shining, uniformly tawny reddish or yellowish, clubs of the antennæ not infuscate; rather closely punctured and clothed with fine, pale golden hairs, decumbent on the head and prothorax, more elevated on the elytra. *Antennæ* stout, very gradually broadening to the club; segments 2—6 are longer than broad, but none of the segments is really elongate; segment 2 about $1\frac{1}{2}$ times as long as broad, 3 slightly shorter, 4 still shorter, 5 nearly equal to 3, 6 shorter, 7 and 8 transverse, produced and obliquely cut away from the apex on one side*. *Head* large and broad, little narrower than the prothorax, markedly transverse† and subrectangular, slightly narrowed in front, hind angles rounded off, produced into a blunt, deflexed apex between the antennæ, the hairs rising from very fine punctures. *Prothorax* viewed from above about as broad as long, reaching its greatest width at about $\frac{1}{3}$ the length from the front, then narrowing gradually, with sides hardly perceptibly sinuate, to the base, which is finely margined and has four deep foveoles before it, two on either side, leaving a slightly wider space between the middle two; hairs rising from very fine punctures. *Scutellum* concealed under prothorax. *Elytra* widest at about the middle, slightly depressed at the base between scutellum and shoulder, and along the suture in the apical portion, rounded-truncate at the extremity and covering the entire abdomen, the hairs rather longer and stronger than those on the prothorax, partly raised from the surface, and rising from stronger punctures. *Pygidium* exposed, but deflexed and bent forwards, only visible from behind or beneath. *Prosternum* rather strongly punctured and pilose. Front part of *mesosternum* also rather strongly punctured: between the middle coxæ it forms a very narrow elevated lamina with raised margins, impunctate and glabrous, slightly broader and rounded in front, raised behind above the front of the metasternum. *Metasternum* convex, finely punctured and rather densely pilose: metasterno-episternal sutures (see p. 208) distinct, grooved, fringed on the inner side with hairs. *Legs* stout and pilose: *tarsi* rather broad, especially the anterior.

♂. Front tarsi broadened. Hind femur (Plate **19**, fig. 9*a*) with a stout, sharp spine on its posterior side near the base, distal to which spine the posterior side of the femur is curiously curved, so that a deep sinus is formed between the spine and the dilated apical part.

♀. Front tarsi normal, hind femora simple.

15 ♂, 11 ♀ from the Seychelles, including 1 pair *in coitu*.

Loc. Seychelles, Mauritius, Rodrigues, Penang, Borneo.

* See footnote, p. 213. Fig. 9 is made from a specimen in which the antennæ are twisted so that the serration appears on the outer side.

† In this and the succeeding species, the statements as to the proportionate breadth and length of head refer only to the part behind the antennæ, visible from directly above, and do not include the mouth-parts, etc.

Seychelles: Mahé, Long Island, Silhouette, Félicité. Not exclusively a mountain-forest species. Mahé: high damp forest between Trois Frères and Morne Seychellois, 1500—2000 feet, xii. 1908; cultivated country, about 1000 feet, xii. 1908 (1 ♀); near Morne Blanc, about 1000 feet; Cascade Estate, about 1000 feet. Long Island (a coconut-planted islet near Mahé), vii. 1908, 2 ♂, one being marked "from beach just above high-water mark." Silhouette: forest near Pot-à-eau, 1500 feet or more, viii. 1908, including 1 ♂ and 1 ♀ marked "Aug. 7, under bark of stump." Félicité: from forest, xii. 1908.

Mauritius: 1 ♀ in British Museum: 10 specimens in Paris Museum from Mon Désert (Carié, 1905).

Rodrigues: 2 ♂, 3 ♀ (Snell and Thomasset, 1918).

Penang: 4 ♂, 1 ♀ in British Museum (ex coll. Bowring).

Borneo: 1 ♂ in British Museum (Pengaron, Doherty).

This species is so widespread that I fully expected to find that it had been described long since. But I have been unable to identify it. The examples in the Paris and British Museums were all unnamed. Specimens were submitted to Dr Karl Holdhaus at Vienna (where Reitter's exotic Scydmænids now are), but he reports that it is unknown to him: he had looked particularly among the species described by Reitter from East Africa. In *S. armatus* the shape of the head is specially characteristic, and I have seen no other *Scydmænus*, named or unnamed, very close to it. It is referred to subgenus *Scydmænus*, *s. str.*, having the front tarsi broadened in ♂, a basal depression on each elytron, and (as remarked above) distinct metasterno-episternal sutures. The Central American *Homoconnus spinipes* (Schauf.) also has a spine on the hind femur, but it is very broad at the base and situated nearer the apex of the femur, and is not (so far as known) confined to one sex. *Homoconnus* is in other respects entirely different from *S. armatus*.

10. *Scydmænus seychellensis*, sp. n.

(Plate **22**, figs. 31, 31*a*.)

Rufo-flavus, modice politus, sat dense punctulatus et pilis pallide aureis vestitus: antennis nec incrassatis nec conspicue gracilibus: capite prothorace distincte angustiore, parum latiore quam longiore, subrectangulari, antrorsum parum dilatato, angulis posticis late rotundatis: prothorace distincte longiore quam latiore, maximam latitudinem versus medium longitudinis attingente, basin versus angustato, foveolis ante basin nullis: scutello minuto: elytris lateribus regulariter arcuatis, apice rotundato-truncatis, utroque basi in medio haud depresso: mesosterno inter coxas medias laminam elevatam, subparallelam, fortiter punctatam, pilosam, quam in *Scydmæno armato* multo latiorem, formante: suturis inter metasternum et episterna distinctis, sulcatis: pedibus normalibus. Long. corp. 1·4 mm.

Entirely tawny reddish or yellowish, moderately shining, rather closely punctulate and clothed with fine, decumbent, very pale golden hairs. *Antennæ* neither very stout nor very slender: segment 2 between 1½ times and twice as long as broad, segment 3 shorter, 4 still shorter, 5 subequal to 3, 6 but little longer than broad, 7 about as long as broad, 8 transverse, 7 and 8 cut away obliquely from the apex on the inner side, as in the preceding species. *Head* moderately large, but appreciably narrower than the prothorax, transverse but longer in proportion than in *S. armatus*, subrectangular, slightly broadened in front

(the reverse of the condition in *S. armatus*), hind angles broadly rounded off; produced between the bases of the antennæ into a blunt and much deflexed apex, not visible from directly above. *Prothorax* distinctly longer than broad, reaching its greatest breadth at nearly ½ the length from the front, its sides having a more gradually curved, much less "shouldered," appearance than in *S. armatus*, narrowed towards the base, without any foveoles. *Scutellum* very minute, with difficulty visible. *Elytra* regularly curved at the sides, rounded truncate at the apex, leaving the pygidium visible when the insect is viewed from behind, with a small re-enterant angle at the end of the suture, scarcely perceptibly depressed at the base between scutellum and shoulder. *Punctuation* of head, prothorax and elytra fine, the punctures separated by several times their own diameter, not perceptibly stronger on the elytra, though the hairs on the elytra are slightly stronger and less closely decumbent. *Prosternum* rather closely pilose. *Mesosternum* forming a narrow, elevated lamina between the middle coxæ, but this lamina is of quite a different shape to that of *S. armatus*, being much broader, nearly parallel-sided, only very slightly narrowed behind, truncate and elevated above (*i.e.* ventral to) the metasternum at its hind end, coarsely punctured and pilose. *Metasternum* very smooth and convex, with very fine, rather close hairs: sutures separating the episterna from the metasternum very distinct (Plate **22**, fig. 31*a*), deeply grooved, and fringed on the inner side with hairs. *Legs* and *tarsi* presenting no marked features. No secondary sexual difference has been perceived.

6 examples.

Loc. Seychelles. Silhouette, Mahé. Silhouette: forest near Pot-à-eau, viii. 1908, 2 specimens; forest above Mare aux Cochons, over 1000 feet, from decayed stem of native palm, 1 specimen; same locality, from decayed outer leaf-bases of a *Stevensonia*-palm, 1 specimen. Mahé: high damp forest between Trois Frères and Morne Seychellois, 1500—2000 feet, xii. 1908, 2 examples.

It is doubtful to what subgenus this species should be referred. The elytra have no basal impression, the tarsi are not dilated, and in the 6 specimens known no secondary sexual character has been observed. The prothorax is finely punctured, which seems to exclude subgenus *Eustemmus*, Reitter, as hitherto defined, though the other characters might agree with those of *Eustemmus*. The metasterno-episternal sutures are distinct and grooved, as in *S. armatus*, etc. Several species that I have seen resemble *S. seychellensis* fairly closely in general characteristics, but it is distinguished by its particular form and proportions of head, prothorax, etc.—especially the shape and proportions of the head, and its size relative to the remainder of the body, intermediate between the large transverse head of *S. armatus* and the small head of *S. insularum*. An undetermined form from Penang, of which there is a series in the British Museum (ex coll. Bowring), resembles *S. seychellensis* rather closely, but is smaller and has a relatively narrower head, longer prothorax, reaching its greatest width near the front, etc.

11. *Scydmænus insularum*, sp. n.

(Plate **22**, figs. 32, 32*a*, 32*b*.)

Minor, omnino rufo-flavus, modice politus, pilis pallide aureis haud densius vestitus: antennis segmentis haud conspicue elongatis, 3—5 paullum longioribus quam latioribus: capite parvo, prothorace conspicue angustiore, parum latiore quam longiore, lateribus postice arcuatis, angulis posticis fere nullis: prothorace parum longiore quam latiore, maximam latitudinem paullo ante medium attingente, basin versus angustato, foveolis ante basin nullis: scutello invisibili: elytris lateribus regulariter arcuatis, apice rotundato-truncatis, utroque in mediâ basi parum depresso: mesosterno inter coxas medias laminam elevatam, fortiter punctatam, pilosam, eâ *Scydmæni seychellensis* angustiorem, formante: suturis inter metasternum et episterna omnino obsoletis: tarsis omnibus compressis, desuper visis filiformibus, de latere visis (in ♂ magis conspicue) latis. Long. corp. 1·3 mm.

A smaller form, characterised by its small head, deep, laterally compressed tarsi, and the absence of sutures between the metasternum and its episterna. Entirely tawny reddish or yellowish, moderately shining; finely punctured, the punctures on the elytra wider apart than those on the prothorax, and the pale golden hairs, on head and prothorax as well as on elytra, more elevated than in *S. seychellensis*. *Antennæ* with none of the segments elongate: 3, 4 and 5 subequal, about 1½ times as long as broad, 6 and 7 moniliform, about as broad as long, 8 transverse; 6, 7 and 8 cut away obliquely from the apex on one side, though this is less noticeable than in the other Seychellean species and only visible in certain positions. *Head* small, considerably narrower than prothorax, but appreciably broader than long, slightly broadened in front, with sides arcuate and hind angles quite rounded off; produced into a blunt, deflexed apex between the antennæ. *Prothorax* a little longer than broad, reaching its greatest breadth a little before the middle, with sides arcuate, not markedly "shouldered," narrowed towards the base, with no foveoles before the base. *Scutellum* invisible. *Elytra* regularly arcuate at the sides, separately rounded-truncate at the apex, leaving the deflexed pygidium visible from behind, each one slightly depressed in the middle at the extreme base. *Prosternum* smooth, its pilosity and punctuation very scanty and fine. *Mesosternum* forming between the middle coxæ a narrow, elevated lamina, which is coarsely punctured and pilose, narrower than the lamina in *S. seychellensis*, truncate and raised above (*i.e.* ventral to) the metasternum at its hind end. *Metasternum* convex, smooth, finely punctured and pilose: no sutures at all are visible between it and the episterna, even with careful examination under a high power (Plate **22**, fig. 32*a*). *Legs* normal: *tarsi* of peculiar construction, the segments laterally compressed but deep, so that the tarsus appears slender from above, but broader from the side: this applies to both sexes, but is much more marked in the ♂, in which sex all three pairs appear much dilated when viewed from the side (Plate **22**, fig. 32*b*).

35 examples.

Loc. Seychelles. Mahé, Silhouette, Praslin. Mahé: from near Morne Blanc; high, damp forest between Trois Frères and Morne Seychellois, 1500—2000 feet, xii. 1908; Cascade Estate, about 1000 feet; Mare aux Cochons district, about 1500 feet. Silhouette: forest near Pot-à-eau, about 1500 feet, viii. 1908; high forest above Mare aux Cochons,

four specimens from a rotting branch, 24. ix. 1908. Praslin: from the Coco-de-Mer (*Lodoicea*) palm forest in the Vallée de Mai, Côtes d'Or Estate, xi. 1908, 21 examples.

S. insularum is distinguished by its small size, short antennal segments, small head, the particular shape of its prothorax, rather elevated hairs and sparse elytral punctuation, the sparseness and fineness of its prosternal punctuation, narrow mesosternal lamina, absence of metasterno-episternal sutures, and deep, compressed tarsi. Some of its characters are those of subgenus *Heterognathus*: the basal impressions on the elytra are extremely slight, the prothorax is finely punctured but without foveoles, and metasterno-episternal sutures are wanting (probably a good character of *Heterognathus*, see p. 208). But the tarsi are of peculiar structure and exhibit a secondary sexual difference. The insect is just of the same size, colour, and general appearance as the European *S.* (*Heterognathus*) *rufus*, but its head is even smaller than that of *S. rufus*, and the peculiar tarsal structure also distinguishes it: its elytra are less dilated about the middle, and there are also other points of divergence. I have seen various unnamed exotic specimens (especially Oriental) which look very like *S. insularum* at first sight, but on close examination all have proved to be distinct.

12. *Scydmænus lodoiceæ*, sp. n.

(Plate **20**, figs. 13, 13*a*.)

Gracilis, prothorace elytrisque valde convexis, lævis, politus, aureo-pilosus, piceo-niger, pygidio, pedibus, antennis piceo-rufis, harum clavis nigrescentibus: capite depresso, subquadrato, angulis posticis rotundatis, fronte super antennarum bases parum elevatâ ac medio concavâ: antennis longis, tenuibus: prothorace antrorsum lateribus fortiter arcuatis, ad basin angustato, basi tenuiter marginato, disco parce subtiliter punctulato (hoc et capite pilis aureis decumbentibus), punctis ad basin fortioribus: scutello celato: elytris ad basin valde declivibus, pilis erectis, fortioribus, sat dense vestitis: pedibus elongatis, gracilibus, femoribus apicem versus dilatatis; femoribus anticis subtus carinis 2 longitudinalibus, quarum posticâ dentium serie instructâ, anticâ fere obsoletâ sed apice dente magno, laminato, munitâ. Long. corp. 2·3 mm.

A graceful form, with long slender legs and antennæ, the prothorax and elytra strongly convex (their convexities separate): pitchy-black, prothorax sometimes obscurely rufescent, pygidium, legs, antennæ and palpi pitchy-reddish to paler red-brown, the last 3 segments of the antennæ blackish: smooth, highly polished, clothed with fine golden hairs, which are much stronger and semi-erect on the elytra. *Head* somewhat flattened, subquadrate with hind angles rounded off; slightly elevated and produced above the bases of the antennæ, the middle part of this elevated portion being depressed and concave, so that in some positions the front appears almost bituberculate. *Eyes* not very large. *Antennæ* long and slender; segments 2—5 all much longer than broad, but differing greatly *inter se*; 2 rather short, 3 about half as long again as 2, 4 shorter (nearly equal to 2), 5 longer even than 3; 6 a little shorter than 3, 7 but little longer than broad, 8 about as broad as long; 6, 7 and 8 are of peculiar form, giving the antenna a serrate appearance on the inner side, owing to the points of articulation being on the outer side of the segments, and each segment being cut off obliquely on its inner side towards the apex*; 9, 10, 11 all longer than

* In some specimens the antennæ are twisted, and the serration is either not visible at all from above, or may even appear on the outer side.

broad, gradually broadening to form the club. *Prothorax* strongly convex, narrowed and with rounded sides in front, its greatest breadth being before the middle, narrowed behind, and its surface sloping steeply down to the finely margined base. The fine sparse hairs are decumbent and rise from very fine punctures (as also on the head), but towards the base the punctures become stronger and there are one or two irregular rows of quite strong ones along the base. *Scutellum* invisible (except when the pronotum is drawn away from the base of the elytra). *Elytra* sloping very steeply at the base, with shoulders fairly well marked; subtruncate at the apex with a very slight re-enterant angle at the end of the suture; leaving the pygidium exposed; the semi-erect hairs stronger and closer, and rising from stronger punctures, than on the prothorax or head. *Prosternum* with coarse, shallow punctures and decumbent golden hairs. *Metasternum* convex, very smooth and highly polished, almost glabrous in the middle but with sparse golden hairs rising from fine punctures at the sides and forming a dense fringe round the hind margins of the mid-coxal cavities: no metasterno-episternal sutures visible. *Legs* long and slender, femora dilated towards the apex: the front femur (Plate **20**, fig. 13*a*) has on its lower surface two longitudinal ridges, the posterior bearing about 11 short teeth, the basal one of which is larger, broader, and laminate; while the anterior ridge is nearly obsolete, but bears at its distal end a broad, thin, laminate projection with sharp apex: in the middle and hind femora the lower surface is grooved towards the apex for reception of the tibia, but ridges and teeth are absent. Middle and hind *tarsi* long, slender and filiform; front tarsi shorter, with the first three segments broader and setose beneath.

Loc. Seychelles. Praslin: eight examples, all taken together from between the leaf-bases of a growing male *Lodoicea*-palm (Coco-de-Mer), in the Vallée de Mai, Côtes d'Or Estate, 28. xi. 1908.

This insect seems without doubt to fall into the subgenus *Heterognathus*. It is distinct from anything that I have seen, though it has a considerable resemblance to the W. Australian *S. optatus*, Sharp, and is to some extent like the New Zealand *S. edwardsi*, Sharp. *S. optatus* is of the same general build, slender and graceful, with long antennæ and legs; like *S. lodoiceæ* it is devoid of metasterno-episternal sutures. It also has the front femora toothed in the ♂, though not in the ♀ (this was not alluded to in the original description, *Tr. Ent. Soc.* 1874, p. 515): but the arrangement of the teeth differs in detail. Judging by analogy, the toothed femora should be confined to the ♂ in *S. lodoiceæ* also: this may be the case, but I have no proof of it, and it would involve all the eight known examples of *S. lodoiceæ* being ♂. The specimen which I have compared most closely with *S. lodoiceæ* is an undetermined West Australian example in the British Museum (Fry Coll.), which I believe to belong to *S. optatus*; this example is smaller than *S. lodoiceæ*, and differs in the relative lengths of the antennal segments, etc.: on its front femora both ridges bear a series of minute teeth, much more numerous than in *S. lodoiceæ*; it has no large basal tooth on the posterior ridge, but it has a thin, laminate tooth, similar to that in *S. lodoiceæ*, at the apex of the anterior ridge. The relationship between *S. lodoiceæ* and these Australian insects must undoubtedly be close.

Neuraphini.

Stenichnoteras*, gen. nov.

Forma egregia, polita, in partibus quibusdam pilis longis, erectis, dense vestita. Caput parvum, cum prothorace collo angusto articulatum: vertice aream subpolygonalem, lateribus argutis, fere carinatis, formante. Oculi parvi, valde prominuli, facettis haud distincte separatis. Prothorax conspicue latus, antice lateribus valde expansis, basin versus angustatus, angulis anticis late arcuatis, latere utroque de angulo postico ad angulum anticum arguto, fere carinato. Scutellum haud visibile. Elytra sine humeris, postice fortiter ampliata, abdomen omnino obtegentia. Prosternum ante coxas brevissimum. Coxæ anticæ contiguæ, posticæ modice inter se distantes. Genus *Stenichno* etc. affine, sed formâ capitis, oculorum, prothoracis valde distinctum.

A remarkable and bizarre insect, known from only two examples, probably ♂ and ♀: related to *Neuraphes* and *Stenichnus*, but differing from both. *General form* characterised by small head and narrow neck, broad, cordiform prothorax, narrow waist, and strongly convex elytra even broader than the prothorax, and reaching their greatest breadth behind the middle. *Surface* smooth and shining, clothed with long, erect hairs except in certain parts. *Head*, viewed from above, forming a smooth, slightly convex area (which bears a very few, fine, yellowish hairs), with sides curved behind and narrowed to the narrow neck, in front also narrowed and in outline recalling part of a polygonal figure, for there is an angle on either side above the base of the antenna, and in front of these angles the vertex is produced into a bluntly tapering portion, strongly deflexed between the bases of the antennæ. The vertex is bounded on either side by a sharp edge, concealing the lateral parts from above. *Eyes* rather small, much elevated and very convex, so that they are visible from above in spite of the overhanging edges of the vertex: in side view they are seen to be irregularly kidney-shaped (Plate **20**, fig. 14 *a*): even when magnified up to about 100 diameters no clear division into facets can be discerned, though in certain positions there are obscure indications of such. *Sides* and lower part of head behind the eyes bearing dense, erect hairs, some stouter, others very fine and wavy (as on the prothorax). *Antennæ* rather stout, with 4-segmented club, which broadens towards the apex; segments 3—7 between $1\frac{1}{2}$ times and twice as long as broad, moniliform, segments 8—10 dilated, each broader than the last, segment 11 (Plate **20**, fig. 14 *b*) very large and broad, longer than 9 and 10 together, its inner edge nearly straight, outer side more curved and bearing 3 large, brown, translucent vesicles in one specimen, while in the other these are much paler and less conspicuous (see below): the antennæ are very hairy and the distal segments bear long, erect setæ, distinct from the ordinary hairs. *Clypeus* and *labrum* bearing long, erect hairs, those on the clypeus in a transverse series of about 6. *Mandibles* long, slender, curved, sharply and finely pointed, with a rather long, sharp tooth a little beyond the middle of the inner side. *Maxillary palpi* much as in *Stenichnus*: basal segment long, slender, and curved, segment 2 dilated, 3 and 4 forming a small, tapering, finely acuminate apex, capable of being bent at an angle to the dilated 2nd segment: the specimen which has the brown vesicles at the apex of its antennæ, has also a large brown

* From *Stenichnus*, and τέρας, a monster: *i.e.* a bizarre or monstrous form related to *Stenichnus*.

globule on the dorsal side of each palp, at the apex of the dilated 2nd segment, and the whole of this segment appears to be covered with a hardened translucent substance in which the hairs are stuck down; in the other specimen the globules are absent and the hairs elevated.

Prothorax much broader than the head, transverse, broadly cordiform, produced in the middle in front into a narrow portion with which the neck is articulated; narrowed behind, hind angles very obtuse, sides forming an overhanging edge right from the hind to the front angles: disc rather flattened, smooth, bare, impunctate in the middle, with two elongate, shallow grooves (present in one example only), and 4 foveoles before the base, the outer two of which are concealed in the hairy portions of the disc and produced each into a longitudinal fold; lateral portions of disc punctate, densely covered with long, erect hairs of two kinds, some being stout, dark brown and straight, others much longer, pale, extremely fine and wavy towards the end. *Scutellum* invisible. *Elytra* smooth, shining, very convex, narrower at the extreme base than the base of the prothorax, without shoulders, reaching their greatest breadth behind the middle, broader at their widest point than the greatest breadth of the prothorax, strongly deflexed at the sides and behind and forming together a single rounded-acuminate apex, completely concealing the abdomen even when viewed from behind; with one or two very small impressions at the extreme base of each elytron; sparsely covered with very long, fine, erect hairs, all of one kind. *Wings* not examined. The lateral parts of the mesothorax project considerably on either side between prothorax and elytra, and bear a very dense group of hairs of the two kinds, as on the prothorax. *Insect viewed from beneath:* head flattened, bare; *prosternum* extremely short, only forming a very narrow bridge in front of the large, exserted, contiguous *front coxæ: mesosternum* difficult to see clearly owing to the dense pilosity, but apparently not forming a long elevated keel, but only a very short elevated tubercle between the almost contiguous *middle coxæ: hind coxæ* separated by about the breadth of one of themselves: the lateral parts of the prosternum, all the coxæ, the mesosternum between the middle coxæ, the front of the metasternum and its side margins, all very densely pilose; remainder of metasternum smooth, convex, shining, finely and rather sparsely pilose. *Legs* and *feet* densely hairy; besides the ordinary hairs the front and middle tibiæ bear, on the posterior side towards the apex, close series of flattened short spines or hairs: femora dilated towards apex: tarsi filiform (showing no difference in the two specimens).

This insect presents certain features which would suggest that it might be termitophilous or myrmecophilous. It was, however, found above the limit of vertical distribution of termites, in the dense, damp, mountain-forest, and I have no note or recollection of having taken it in association with ants. The features alluded to are the curious globules on the terminal antennal segment and on the maxillary palpi; the dilated antero-lateral portions of the prothorax; and the existence of two distinct kinds of hairs, shorter and stouter standing among very long and fine ones on head, prothorax, and lateral parts of mesothorax. Without larger material and dissection it is not possible to determine the nature of the globules: at first I thought they were some foreign matter adhering, but they are not detachable, and their regular formation (Plate **20**, fig. 14 *b*) and complete symmetry on both antennæ and both palpi are remarkable: can they be some hardened, viscous secretion of the insect itself?

The differences between the two specimens are as follows, but a determination of the sex has not been possible:

(i) No elongate grooves on middle of prothorax: 3 large, dark brown vesicles on terminal antennal segment: globules present on maxillary palpi, 2nd palp-segment coated in hardened translucent substance.

(ii) 2 elongate grooves on middle of prothorax: pale, colourless vesicles, with difficulty discernible, on antennæ: no globules on palpi, hairs on 2nd segment of palp normal.

The remarkable form of the head, with the overhanging edges of the vertex, the small, highly prominent eyes without clear division into facets, and the expanded shape of the prothorax, are the features which separate this insect from any of the neighbouring genera. The sharp lateral edges of the prothorax recall those of *Neuraphes*, but in *Stenichnoteras* they are continued right to the front angle. The position of the eyes some distance in front of the base of the head recalls *Euconnus* rather than *Stenichnus* or *Neuraphes:* so does also the moderate (as opposed to very small) width of the space between the hind coxæ. The extreme shortness of the prosternum is also noticeable; and the apparent extreme shortness of the mesosternal keel is probably peculiar to the genus.

Type of the genus, *Stenichnoteras montanum*, sp. n.

13. *Stenichnoteras montanum*, sp. n.

(Plate **20**, figs. 14, 14 *a*, 14 *b*.)

Ut supra descriptum: capite prothorace piceo-nigris; elytris, antennis, palpis, pedibus, piceo-castaneis; pilis sordide flavescentibus. Long. corp. 2·0 mm.

With the characters of the genus. Colour as described immediately above. The hairs give the impression of being dirty yellowish; the stouter hairs on prothorax, etc., are darker.

Loc. Seychelles: Mahé. From the highest and dampest zone of endemic forest, on the summit of Morne Pilot, over 2000 feet. I only visited this spot twice, 29. x. and 15. xi. 1908, and have no note of the exact habitat of these beetles, but probably they were from damp, decaying leaves on the ground.

Euconnus, Thomson.

The two following species are referred to this genus with some hesitation. They have the general form of *Euconnus*, and the antennæ, palpi etc. are constructed on the plan associated with that genus. The forward position of the eyes—a considerable distance in front of the front margin of the prothorax—is also characteristic. But the hind coxæ are contiguous, or separated at most by a scarcely perceptible interval and by a minute process of the metasternum, and this condition is certainly not what is found in many, at least, of the described species of *Euconnus*. Ganglbauer (*Käf. Mitteleur.* iii. 1899, p. 41) gives "separated hind coxæ" among the characters of the genus. The contiguity of the hind coxæ in these Seychellean species recalls the genus *Neuraphes*, but that differs in having definite lateral edges to the prothorax, at least in the posterior part. Probably the Seychelles forms should be placed in a separate section of *Euconnus*, or in a new genus intermediate between *Euconnus* and *Neuraphes*.

The conical form of the prothorax recalls the subgenus *Napochus* (of *Euconnus*). In neither of the Seychellean species has the prothorax any definite margin at the sides; it is simply deflexed in a continuous curve: this lack of a lateral edge is an accepted character of *Euconnus*.

Neither of the Seychelles species resembles at all closely any Scydmænid which I have seen in the British or Paris Museums, and Dr Holdhaus of the Vienna Museum, to whom examples of both were submitted, considers them to be undoubtedly new to science, and wondrous little creatures also. *E. senex*, especially, is a remarkable, almost grotesque, insect. The nature of the localities in which both species were found, and their close association with purely endemic vegetation, render it extremely likely that both are themselves endemic.

14. *Euconnus senex*, sp. n.

(Plate **20**, figs. 15, 15 *a*.)

Obovatus, valde convexus, politissimus, supra omnino glaber (capite postice excepto); capite prothoraceque impunctatis, elytris subtiliter, fere obsolete, punctulatis: capite collo conspicue angusto munito, supra convexo, antrorsum dilatato, antice in medio angulatim producto, serie setarum longarum trans partes posticas verticis dispositâ: antennis clavâ laxâ, 3-segmentatâ, segmento 8° parum dilatato, inter funiculum et clavam intermedio: prothorace parum latiore quam longiore, antice valde angustato, lateribus fortiter deflexis, margine arguto nullo, angulis posticis latissime arcuatis, foveolis nullis; scutello triangulari: elytris latitudinem maximam ad medium attingentibus, lateribus fortiter deflexis, apice separatim anguste rotundato-truncatis: coxis posticis contiguis: pedibus gracilibus, tarsis filiformibus. Long. corp. 1·5 mm.

A remarkable insect, in general appearance characterised by the rather small head borne on a narrow neck, and the prothorax and elytra together forming an obovate or almost pyriform body; very convex (prothorax and elytra in side view forming together a single curve), extremely highly polished, entirely glabrous above except for the back of the head (and sides of the prothorax, where a few hairs project from beneath), impunctate except on the elytra: entirely pitchy black, the antennæ, palpi, legs, and underside of the body more or less reddish (antennæ and legs blacker in some examples, redder in others): hairs yellowish.

Head at its widest part about $\frac{2}{3}$ the breadth of the base of the prothorax, convex and highly polished on top, widening to the front, where it is widest at the level of the eyes, produced in front into a rather sharp apex, which is somewhat deflexed but easily visible if the head is slightly tilted; having two rufous spots at the front margin, just above the bases of the antennæ; a close group or brush of fine, stiff hairs at each hind angle (Plate **20**, fig. 15 *a*), and a series of about sixteen longer, stouter, yellowish hairs, commencing on either side immediately behind the eye, and extending round the back of the vertex. *Eyes* rather prominent, coarsely facetted. *Antennæ* slender: segment 1 elongate, curved, 2 more than twice as long as broad, 3 very short and small, no longer than broad, 4—6 subequal, only a little longer than broad, 7 slightly longer, 8 dilated, forming a transition between funicle and club, 9—11 forming a loose club, 9 being longer than broad, 10 and 11 more dilated than 9 and about equally broad, the club-segments pilose, and the whole

antenna also with long, fine, outstanding hairs. *Prothorax* wider at its base than long, very strongly narrowed to the front, with outline at the sides only feebly curved; front margin less than $\frac{1}{3}$ the breadth at the base; strongly deflexed at the sides, but with no definite edge; a few long, fine hairs rise from the deflexed lateral parts; seen from the side, the hind angles are practically non-existent, the margin being broadly arcuate; a small angle is formed in the outline of the body (viewed from above) at the junction of prothorax and elytra, and the fine hairs on the lateral parts of the mesosternum are visible from above; base of prothorax not margined, foveoles completely absent, disc highly polished, entirely impunctate. *Scutellum* rather large, broadly triangular (hidden when the pronotum is pushed back). *Elytra* widest at about the middle; strongly deflexed at the sides and behind; each of them separately and narrowly rounded-truncate at the apex; completely hiding the abdomen even when viewed from behind; with no folds or impressions at the base; surface entirely glabrous, finely and nearly obsoletely punctate, the punctures separated by two or more times their own diameter. *Wings* fully developed, fringed with long hairs. *Insect viewed from beneath:* side parts of head pilose; a dense group of hairs on the extreme front angles of the deflexed portion of the pronotum, immediately in front of the coxæ: *mesosternum* forming between the coxæ a sharp, elevated keel, continuous with the front of the metasternum; lateral parts of mesosternum densely pilose: *metasternum* highly convex, shining, finely pilose in front, very sparsely pilose behind: *hind coxæ* contiguous. *Legs* slender, sparsely and very finely pilose; *tarsi* filiform.

11 examples.

Loc. Seychelles: Mahé, Silhouette. Mahé: from near Morne Blanc, three specimens, two being marked "from dead leaves in high forest" (1000—2000 feet), xi. 1908; Cascade Estate, 1000 feet or more. Silhouette: forest above Mare aux Cochons, over 1000 feet, one specimen from decayed head of a felled *Verschaffeltia*-palm, ix. 1908; one example found drowned in a pitcher of *Nepenthes* on one of the very highest peaks, over 2000 feet, viii. 1908; four specimens from among dead leaves, mostly decaying palm leaf-bases, on the ground in a very damp shady place, 1500 feet or more, 15. viii. 1908.

15. *Euconnus seychellensis*, sp. n.

(Plate **20**, fig. 12.)

Elongato-obovatus, sat depressus, sat dense punctulatus, setis curtis, semi-erectis, flavescentibus, vestitus: piceo-niger, corpore subtus, antennis, pedibus, palpis, piceo-rufis vel brunneis: capite postice fortiter angustato et arcuato, antice in medio angulatim producto et depresso, vertice in medio pilis aliquibus curtis, tenuibus, postice pilis longioribus ac crassioribus, sat numerosis, vestito: antennis sat brevibus, clavâ abruptâ, 3-segmentatâ: prothorace parum longiore quam latiore, antrorsum valde angustato, angulis posticis (desuper visis) omnino rotundatis, lateribus margine arguto nullo, disco foveolis 4 ante basin munito: scutello minuto: elytris maximam latitudinem ad medium attingentibus, apice separatim rotundatis, basi inter humerum et scutellum vage impressis, prothorace fortius punctatis, lateribus (cum lateribus prothoracis) et parte posticâ disci setis nonnullis, elongatis, tenuibus, erectis, instructis: coxis posticis contiguis. Long. corp. 1·3 mm.

An insect with the head borne on a narrow neck, the remainder of the body elongate-

obovate, rather flattened, the prothorax and elytra (viewed from the side) forming two separate, flattened curves, and the outline (seen from above) deeply interrupted at the junction of prothorax and elytra. Shining, rather closely punctured and covered with short, semi-erect, brownish-yellow hairs, and bearing also some long, fine, erect hairs. Pitchy black, with legs, palpi and antennæ pitchy reddish or brownish, club of the antennæ darker. *Head* markedly narrowed and arcuate behind, angularly produced and depressed in the middle in front, with the median part bearing a few fine hairs, sides and posterior parts of vertex bearing stiff hairs directed backwards, and with a brush of stiff hairs on each side on the deflexed lateral part of the head about midway between eye and hind angle. *Eyes* large, prominent, coarsely facetted. *Antennæ* rather short, segments 9—11 forming an abrupt, rather compact club, segments 3—8 all very short, being broader than long or only as long as broad, segments 1 and 2 elongate. *Prothorax* a little longer than broad, strongly narrowed to the front, with hind angles (seen from above) entirely rounded off; strongly and almost angularly deflexed at the sides (especially behind), but not forming a definite side margin or edge: 4 foveoles before the base: disc very finely punctured and pilose, sides more densely pilose and with 2 or 3 long, very fine, outstanding hairs. *Scutellum* very small, triangular. *Elytra* reaching their greatest width at about the middle, separately rounded and quite concealing the abdomen behind, rather vaguely impressed within the shoulder at the base; punctures much stronger than those on the prothorax, two or more times their own diameter apart: besides the short yellowish hairs there are five or six very long, fine, outstanding hairs on the side of each elytron, and several on the posterior part of the disc. *Mesosternum* forming a sharp, elevated, punctured and pilose keel between the middle coxæ. *Metasternum* convex, almost impunctate, very sparsely pilose. *Hind coxæ* contiguous. *Legs* and *feet* not abnormally slender.

10 examples.

Loc. Seychelles: Mahé, Praslin. Mahé: high forest near Morne Blanc, including two specimens from the summit of Morne Pilot, over 2000 feet (same spot as that in which *Stenichnoteras montanum* was found); Cascade Estate, 800—1500 feet. Praslin: three specimens from the Coco-de-Mer forest in the Vallée de Mai, xi. 1908, two of them being from the leaf-bases of the same growing *Lodoicea*-palm that yielded the material of *Scydmænus lodoiceæ*.

Scaphidiidæ.

Seven species of this family are included in the collection. Four belong to the genus *Scaphosoma* and two to *Toxidium*, while the remaining one is placed in a new genus, *Nesotoxidium*. No Scaphidiid has been recorded from any of these islands before. With one exception, I have failed to identify any of these forms with species already described. The British Museum collections have been consulted, and in Paris I had the valuable assistance of Monsieur Julien Achard, who at the time of my visit (Sept. 1920) was engaged on a study of all the Madagascan and Oriental material of this family in the Paris Museum. I am greatly indebted to Mons. Achard for spending a whole day with me in comparing the Seychellean specimens with the Paris material. It has not been possible to see the Oriental species described by Pic (1915, 1916), nor the East African species described by Reitter (1908), nor those described by Heller from the Philippines

(1917): judging from the descriptions, the Seychelles species are not identical with any of these.

The genus *Scaphosoma* is world-wide. Of the four Seychelles species, one is treated as a form of *S. pictum*, Mots., a Ceylonese species. The second, *S. silhouettæ*, is described as a new species from a unique example; it has a certain resemblance—superficial at any rate—to forms known respectively from Australasia, Madagascar, and India. The third, *S. mahense*, is also described as new from a single specimen, but it has a close resemblance to certain unnamed examples from Mauritius, which may prove to be a form of the same species. Nothing can be said of the affinities of the fourth, *S. achardianum*, n. sp.

Toxidium is known from North and Central America, East Africa and Abyssinia, India, Philippine Islands, Japan, and (?) Madagascar*. Two species are described as new from the Seychelles. They exhibit certain anatomical features distinguishing them from certain of their congeners, and which may be useful in the future classification of the species of this genus.

Nesotoxidium, the new genus, is quite distinct, intermediate in some respects between *Toxidium* and *Bæocera*. An East African species (*Toxidium integrum*, Reitter), which I have not seen, may possibly be referable to this genus.

The form and relative length of the segments of the *antennæ* have proved to be valuable characters in the diagnosing of the Seychelles Scaphidiidæ.

The Seychelles specimens were nearly all collected in the endemic mountain-forests at elevations over 1000 feet. Some are from the highest and dampest zones of forest, at or about 2000 feet, *e.g. Toxidium seychellense*, specimens of which were found in very damp, umbrageous places, among rotting dead leaves on the ground. Among the *Scaphosoma*, however, some few examples were obtained in much drier, cultivated places at low elevations, showing that one and the same species can extend from sea-level up to the high forests (*S. pictum* and *S. achardianum*). Three specimens, belonging to as many species (*S. pictum*, *S. silhouettæ* and *S. achardianum*) were found in fungus—probably in the same piece—near the coast of Silhouette, 31. vii. 1908. One example of *S. achardianum* was taken from a nest of the ant *Pheidole punctulata* near the coast of the same island. The Scaphidiidæ were found at various times throughout the duration of my visit, *i.e.* July to March.

Scaphosoma, Leach.

Of the following four species, the first three have the scutellum distinctly visible, the fourth has not. Pic has erected a subgenus *Scutoscaphosoma* for species with scutellum visible and elytra profoundly punctured (*Mélanges Exot.-Ent.*, fascic. 17, 1916, p. 3). These three species comply with these conditions, and the first two may perhaps be regarded as members of the subgenus *Scutoscaphosoma*. As to the third, *S. mahense*, reasons are given below (p. 224) why it may have to be placed in the subgenus *Pseudoscaphosoma* (Pic). None of the four species appears to fall into Ganglbauer's subgenus *Caryoscapha* (1899).

* See Csiki, *Coleopt. Cat.* (Junk and Schenkling), part 13, 1910, p. 17: Achard, *Ann. Soc. ent. France*, 83. 1914, p. 562: Heller, *Wien. Ent. Zeit.*, 36. 1917, pp. 41—50.

16. *Scaphosoma pictum*, Motschulsky, *forma*.

(Plate **20**, fig. 18; Plate **21**, figs. 19, 19 *a*, 19 *b*.)

Scaphosoma pictum, Mots., *Bull. Soc. Imp. Nat. Moscou*, 36. 1863, II. p. 435.

Five specimens are referred to Motschulsky's species, which is known from Ceylon. The Seychelles examples most clearly resemble a form to which Mons. Achard has given (ix. 1920) the MS. name *ceylonense*, and which he considers to be a form of *pictum*. The following description and the figures are drawn from the Seychelles specimens.

Length nearly 1·6 mm.* Variegated with black and yellow, the arrangement of which dorsally is shown in fig. 18. The sides of the head behind the eyes are blackish; prothorax black excepting a narrow mid-dorsal stripe, widening at the extremities, and two large lateral areas, yellow: in one example, the dark colour is hardly visible, and the entire prothorax appears yellow. Elytra with a large yellow spot in the basal half separated from the base, the suture, and the side-margin by narrow dark bands: behind this spot a broad dark band, extending right across the elytron: the apical part of the elytron behind this band entirely pale. Pygidium yellow, and the dorsal segment before it also yellow, but dark at its base. Ventrally the prosternum and abdomen are yellow, meso- and metasterna black. Coxæ and legs yellow.

Head very finely and subobsoletely punctured. *Antennæ* long and slender (Plate **21**, figs. 19, 19 *a*), characterised by the great length of segments 4—6 (particularly of segment 4, which is about 2½ times the length of segment 3), and of segment 8, which is almost as long as segments 7 or 9. *Maxillary palpi*, see Plate **21**, fig. 19 *b*. *Prothorax* finely and rather closely punctured, the punctures separated by about twice their own diameter: sides finely margined. *Scutellum* visible under a high power as a very minute piece posterior to the lobe of the prothorax. *Elytra* with subsutural stria well marked, diverging from the suture somewhat from apex to base, slightly curved outwards at the extreme base; side margins finely reflexed; punctures close and strong, considerably larger than those on the prothorax and equally close, bearing extremely fine, decumbent, pale hairs (as do those also on the prothorax); between the sutural stria and the suture, the punctures are finer and rather closer. *Metasternum* and *first ventral abdominal segment* closely punctured: on the latter the punctuation becomes obsolete laterally, but there is a series of large punctures immediately behind the margin of the post-coxal plates: decumbent pale hairs are specially noticeable on the sides of metasternum and first segment.

Loc. Seychelles: Silhouette, Mahé. Silhouette: from fungus, near the coast, 31. vii. 1908, one example. Mahé: Mare aux Cochons district, 1000—2000 feet, i.—ii. 1909, three examples; from the low country, one specimen.

I have before me an example ex coll. Brit. Mus., from Ceylon (Dikoya, about 4000 feet, G. Lewis), previously unnamed, but determined by Achard as a form of *S. pictum*. This is considerably larger than the Seychelles specimens, and less strongly punctured, particularly on the prothorax, where the punctures are weak, so that the prothorax at first sight looks almost impunctate: the black colour is also much reduced, that on the pro-

* Measurements throughout this genus are taken from the vertex between the eyes to the apex of the elytra. The head is nearly always deflexed, so that the most anterior portion visible from above is the vertex between the eyes; and the pygidium is almost always retracted and not visible from above at all.

thorax consisting of two comparatively narrow longitudinal bands, while on the elytra the basal black band is reduced, and the posterior transverse black band is diminished to a spot, disconnected both from the suture and the side margin.

17. *Scaphosoma silhouettæ*, sp. n.

(Plate **21**, figs. 20, 20 *a*.)

Maius, postice vix angustatum; omnino nigrum, ore pedibusque rufescentibus; antennis sat crassis, segmento 4 quam 3 haud sesquilongiore, 8 circa $\frac{5}{8}$ longitudinem segmenti 7 vel 9 attingente; prothorace tenuissime subobsolete punctulato; elytris fortius punctatis, striâ subsuturali integrâ, cum suturâ parallelâ, basi extus curvatâ et fere ad medium basis elytri continuatâ; metasterno in medio fere impunctato, postice inter coxas subtiliter punctato. Long. corp. circa 1·6 mm.

A little larger than the preceding form, and with elytra very little narrowed behind. Entirely black, except the extreme front of the head, extreme apical margin of the elytra, of the pygidium and of the dorsal segment before it, obscurely reddish; legs rather dark reddish-brown.

Antennæ (Plate **21**, figs. 20, 20 *a*), comparatively speaking, rather stout; segment 4 less than $1\frac{1}{2}$ times the length of segment 3, segment 8 about $\frac{5}{8}$ the length of 7 or 9. *Head* and *prothorax* very finely, subobsoletely, and rather sparsely punctured, the punctures being often several times their own diameter apart. *Scutellum* just visible under a high power as a very minute piece behind the median lobe of the prothorax. *Elytra* with sutural stria distinct, almost throughout its length parallel to the suture, curving outwards at the base and continued nearly half-way across the base of the elytron, this continuation being parallel with, and very close to, the hind margin of the prothorax; punctures larger than those on the prothorax, several times their own diameter apart; the narrow area between sutural stria and suture bears a single series of fine punctures. *Side margins* of elytra fine, less distinctly reflexed than in *S. pictum* (*forma*). The *decumbent hairs* arising from the punctures are excessively fine and short, and only visible under a high power. *Metasternum* almost impunctate in the middle, but bearing fine punctures two or more times their own diameter apart behind, between the coxæ. *First ventral abdominal segment* bearing rather stronger punctures, several times their own diameter apart.

Loc. Seychelles. Silhouette: from fungus near the coast, 31. vii. 1908, one example.

Mons. Achard considered this to be a new species, quite distinct from any known to him. Two new species of which he had drawn up manuscript descriptions (ix. 1920), *S. madagascariense* and *S. minutum* (the latter from Sikkim), have some resemblance to it, and have the subsutural stria of much the same form, but in them the punctuation of the elytra is much stronger and closer, and there are other points of divergence. I have before me an example ex coll. Brit. Mus., from Tasmania (Hobart, 91—88), determined as *Scaphosoma novicum*, Blackburn, a species originally described from Victoria. This Tasmanian specimen strongly resembles *S. silhouettæ* in size and coloration; its subsutural stria and scutellum appear much the same; even its antennæ, though I have not made a balsam-preparation of them, seem very similar, especially in the relative lengths of segments 7—9; but the general form appears a trifle narrower, and the elytra are very much less closely and strongly punctured.

18. *Scaphosoma mahense*, sp. n.

(Plate **20**, fig. 17; Plate **21**, figs. 21, 21 *a*.)

Minus, postice conspicue angustatum; nigrum, maculâ magnâ, obliquâ, rufo-flavâ in elytro utroque, elytrorum parte apicali pallide flavo-testaceâ, antennis pedibusque flavis; antennis curtioribus, segmentis 4 et 8 quam in *Scaphos. picto** brevioribus, hoc quam segmento 7 vel 9 distincte breviore; prothorace subtiliter punctulato, lateribus tenuiter marginatis; elytris fortius sed parcius punctatis, striâ subsuturali antice a suturâ conspicue divergente et haud extus curvatâ, basin haud attingente, intervallo inter striam et suturam dense subtiliter punctulato. Long. corp. fere 1·4 mm.

Smaller than *S. pictum*, and with the elytra markedly narrowed behind. Black, with a large, oblique, reddish-yellow spot on each elytron, and the apical part of the elytra pale yellowish-testaceous; pygidium and the dorsal segments before it blackish; antennæ, palpi, and legs yellowish.

Antennæ (Plate **21**, figs. 21, 21 *a*) shorter than those of *S. pictum*, segment 4 less than twice the length of 3, and 8 only about $\frac{3}{4}$ the length of 7 or 9. *Head* and *prothorax* finely punctured, the punctures on the prothorax a trifle less close than in *S. pictum*. *Scutellum* visible under a high power as a minute piece behind the median lobe of the prothorax. *Elytra* with subsutural stria well marked, diverging in front from the suture more widely than in *S. pictum*, not reaching so near to the base of the elytron as in that species, and not curved outwards at the base; side margins very finely reflexed; punctures a little larger than those on the prothorax and much further apart, except on the area between the subsutural stria and the suture, which is very finely and very closely punctured, the punctures being about three deep in the basal part of this area: at the base of the elytra, on either side of the median thoracic lobe, the punctures are confluent, forming rugæ or wrinkles. The fine *decumbent hairs* require a very high power for their discernment. *Metasternum* and 1*st ventral abdominal segment* closely reticulated, bearing fine punctures (two or more times their own diameter apart) fairly evenly distributed over the middle and sides of these parts: the punctures bear fine, decumbent hairs.

Loc. Seychelles. Mahé: Cascade Estate, ca. 1000 feet, 1 example.

Two specimens from Mauritius (Curepipe, 1897, Alluaud) in the Paris Museum resemble *S. mahense* fairly closely in size and general appearance. The pale marks on the elytra are, however, rounder and nearer to the base, and the elytral punctuation is stronger in them. I have not examined their antennæ in detail.

S. mahense should perhaps be regarded as belonging to the group *Pseudoscaphosoma*, described as a distinct genus by Pic (*Échange*, 31. 1915, p. 31) to include several new species from Java and Borneo, but considered by Achard (*Bull. Soc. ent. France*, 1915, p. 292) as at most only a subgenus of *Scaphosoma*. The characteristic of *Pseudoscaphosoma* lay in the form of the subsutural stria on the elytra, which is oblique, diverging markedly from the suture. But this does not by itself seem sufficient to constitute a separate group, since there are species

* Throughout this description comparisons with *S. pictum* refer to the Seychellean form of that species described above.

showing intermediate conditions between it and normal *Scaphosoma*. It is possible that further points will be noticed, sufficient to justify the segregation of *Pseudoscaphosoma* as a natural group.

19. *Scaphosoma achardianum**, sp. n.

(Plate **21**, figs. 22, 22 *a*.)

Minutum, omnino flavo-brunneum, elytris ad apicem parum infuscatis, omnino impunctatum; antennis segmento 4° quam 3° vix longiore, 8° quam dimidio 7^{i} vel 9^{i} vix longiore; elytris striâ subsuturali tenui, integrâ, antice extus curvatâ sed haud trans elytri basin continuatâ. Long. corp. circa 1·0 mm.

Very minute, rather broad, with elytra moderately narrowed behind. Entirely yellowish-brown above and below, with elytra darker at the tip. Entirely impunctate above and below, and glabrous (only under a high power some very fine decumbent hairs are visible).

Antennæ (Plate **21**, fig. 22) with segment 4 very little longer than 3, 8 not much more than $\frac{1}{2}$ the length of 7 or 9. *Maxillary palpi*, see Plate **21**, fig. 22 *a*. *Prothorax* and *elytra* finely margined at the sides. *Elytra* with subsutural stria fine but complete, diverging slightly from the suture as its course is traced forwards, curving outwards at the front end, but not continued across the base of the elytron. *Scutellum* not, or at most indistinctly, discernible.

13 specimens.

Loc. Seychelles: Silhouette, Mahé. Silhouette: Mare aux Cochons, over 1000 feet, 2 examples; fungus near coast, 1 specimen, 31. vii. 1908; from a nest of the ant *Pheidole punctulata*, Mayr (A. Foret det.), in a dry fallen branch near the coast at Pointe Étienne, 18. ix. 1908. Mahé: high forest of Morne Blanc, 1000—2000 feet, 24. x. 1908, 5 specimens; Cascade Estate, ca. 1000 feet, 1 example.

I have seen no other Scaphidiid very close to this, and Mons. Achard, to whom I showed specimens (1920), knew of none. There is an unnamed specimen in the British Museum, from Java (ex coll. Bowring), which resembles it in its minute size and uniform brown coloration. But on closer examination the specimen from Java is seen to be slightly larger, to have the prothorax and elytra distinctly, though finely and not very closely, punctured, and to have the scutellum distinct. I have not examined its antennæ.

Toxidium, Leconte.

The geographical distribution of this genus is referred to above (p. 221). Up to Sept. 1920 no Madagascan or Oriental species known to Achard resembled at all closely the two species described as new from the Seychelles. I have not seen the three species described by Reitter from East Africa (*Wien. Ent. Ziet.* 27. 1908, pp. 33—34), but do not think that any of them can be identical with the Seychelles forms: Reitter's first two species are, according to his descriptions, smaller and lighter in colour than the Seychellean insects, and his third (*T. integrum*) is entirely distinct from them, and may even, as mentioned below, be referable to the new genus *Nesotoxidium*.

* Dedicated to Monsieur Julien Achard, President (1920) of the Société entomologique de France.

Certain structural characters, particularly in the sternal plates, have been observed, which separate the Seychelles forms from one another and from the North American *T. gammaroides*. These points are illustrated, and described in the specific descriptions below. It may further be remarked that in neither of the Seychelles species are the *eyes* emarginate in front as they are, for instance, in *T. gammaroides* (see Plate **21**, fig. 27 *c*); they are, in fact, scarcely emarginate at all in the Seychelles insects.

20. *Toxidium seychellense*, sp. n.

(Plate **21**, figs. 23 *a*, *b*, 24 *a*, 25 *a*, 26 *a*, 27 *a*.)

Politum, nigrum, ore, antennarum basi, pedibus, abdominis apice, rufescentibus; antennis longis et gracilibus, segmento 8° segmento 7° vel 9° fere æquilongo; scutello haud visibili; elytris striâ subsuturali antice evanescente; meso-epimeris angustis, ad acetabulas coxarum mediarum attingentibus, lateribus fere parallelis; suturis inter metasternum et meta-episterna haud integris, sed antice et postice evanescentibus. Long. corp. fere 1·6 mm.

Form (fig. 23) elongate-ovate, narrow, the elytra strongly narrowed behind and truncate at the extremity. Entirely shining black, except the basal segments of antennæ, mouth-parts, apex of abdomen, legs and feet reddish (femora darker in the middle). *Antennæ* (Plate **21**, figs. 24 *a*, 25 *a*, 26 *a*) very long and fine; segments 3—6 especially long and slender, 3 distinctly shorter than 4; segment 8 is about $\frac{5}{6}$ the length (or even more) of 7 or 9*. *Maxillary palpi*, see fig. 23 *a*: *labial palpi* 4-segmented, fig. 23 *b*. *Scutellum* not visible. *Elytra* with subsutural stria distinct behind, but vanishing entirely in about the anterior $\frac{1}{3}$ of the length of the elytron. Under a high power *prothorax* and *elytra* are seen to be excessively finely and almost obsoletely punctured, and bearing exceedingly fine, short, decumbent hairs. *Underside* impunctate, almost entirely glabrous. *Legs* long and slender: *front tarsi* with segments 1—4 subequal, 5 a little longer than 3 and 4 taken together: *middle tarsi*, 1 nearly as long as 2 and 3 together, 2, 3 and 4 subequal, 5 distinctly longer than 4: *hind tarsi*, 1 nearly as long as 2 and 3 together, 3 a very little shorter than 2, and 4 than 3, 5 longer than 4. The *mesothoracic epimeron* is quite distinct, and extends to the mid-coxal cavity: it is a narrow piece almost parallel-sided, but tapering a little towards the coxal cavity: its anterior suture is less clearly defined than the posterior. In his description of the genus *Toxidium*, Matthews (B.C.-A., Col. ii. 1, p. 178) gives the mesothoracic "epimera very small, linear, not extending more than halfway to the coxal cavities": Casey (*Ann. N.Y. Ac. Sci.* vii. 1893, pp. 511, 522) writes of the "excessively small or obsolete meso-epimera." I have before me specimens from the British Museum determined as *T. gammaroides*, Lec.: in them the meso-epimera are only visible at all in certain aspects, and with difficulty; they appear to be exceedingly narrow, linear pieces, but reaching the coxal cavity. *T. seychellense*, therefore, differs from this American form in its wider and more distinct meso-epimera. Also the longitudinal suture just outside the middle coxa, separating off the large meso-episternum in the American forms (Casey, *l.c.*),

* The segments (especially 3—6) appear slightly thicker or finer according to the position from which the antenna is viewed. In balsam mounts the dilated distal segments also seem to vary slightly in breadth according to the pressure of the coverslip, etc. Allowance must be made for this in using the figures. The systematic value of the antennal characters is not thereby vitiated, because systematically the important thing is the relative *length* of the segments, and this is not affected by the causes mentioned above.

is absent in *T. seychellense*. A further difference is visible in the metasternum, where the *metasterno-episternal suture* is only visible in the middle part, but quite obsolete at the front and hind ends of the metasternum: whereas in *T. gammaroides* it is a deeply marked suture extending the whole length of the metasternum (Plate **21**, figs. 27 *a—c*)*. *T. seychellense* also has the *metasternum* somewhat impressed behind on either side, immediately in front of the inner half of the hind coxa, and this impression is bounded outwardly by a sharp obliquely longitudinal ridge. Despite these differences, *T. seychellense* agrees so closely with the accepted definition of *Toxidium* in general form, structure of antennæ and mouth-parts (especially the 4-segmented labial palpi), distance of coxæ, etc. that I feel no hesitation in placing it in that genus. An indication that certain of the structural differences mentioned above may be only of specific (not generic) value is given by the succeeding species (*T. praslinense*), which though agreeing closely with *T. seychellense* in almost all structural points, yet differs in the form of the metasterno-episternal suture (see below).

One specimen is very much smaller (scarcely 1·3 mm. long) than the rest—as small as *T. praslinense*—yet agrees absolutely with the type of *T. seychellense* in all other characters.

24 specimens.

Loc. Seychelles: Silhouette, Mahé. Silhouette: high forests near Pot-à-eau and above Mare aux Cochons, 1000—2000 feet or more, viii—ix. 1908. Mahé: high forest of Morne Blanc, x. 1908; forest above Cascade, 1000—2000 feet, i—ii. 1909. Two of the Silhouette specimens have the following records attached: "from damp dead leaves in high jungle," and "from dead leaves, mostly decaying leaf-bases of palms, on the ground in a very damp, shady place at 1500 feet or more."

21. *Toxidium praslinense*, sp. n.

(Plate **21**, figs. 24 *b*, 25 *b*, 26 *b*, 27 *b*.)

Toxidio seychellensi simillimum, sed minus; antennis parum brevioribus, segmento 8° quam segmento 7° vel 9° conspicue breviore; suturis inter metasternum et meta-episterna per totam metasterni longitudinem integris. Long. corp. 1·4 mm.

Three examples from Praslin exhibit the following differences from *T. seychellense*. *Size* smaller. *Coloration* almost identical, only the upper side is a little less deep black, appearing a pitchy brownish-black; legs with the femora more uniformly reddish, less darkened in the middle. *Antennæ:* the differences between these organs in this species and in *T. seychellense* are shown especially by figs. 24 *b*, 25 *b*, 26 *b*: segment 1 is shorter in proportion to 2; 3 and 4 subequal, instead of 4 longer than 3; 8 about $\frac{2}{3}$ as long as 7 or 9 (considerably shorter in proportion than in *T. seychellense*). *Metasternum:* the suture separating the episternum is a deep groove extending from the posterior margin almost to the extreme front end of the length of the metasternum (Plate **21**, fig. 27 *b*).

The *palpi, legs, tarsi, subsutural stria* of elytra, *mesothoracic epimera*, ridges on the hind part of *metasternum*, etc., closely resemble those of *Toxidium seychellense*, to the description of which reference may be made.

Loc. Seychelles, Praslin: Coco-de-Mer forest in the Vallée de Mai, Côtes d'Or Estate, xi. 1908, 3 specimens.

* Compare remarks on the presence or absence of the metasterno-episternal sutures in *Scydmænus*, *ante*, pp. 207—8.

NESOTOXIDIUM, gen. nov.

Corpus valde compressum, ut in *Toxidio*. Oculi antice haud emarginati. Antennæ 11-segmentatæ, segmento 8° brevissimo, segmento 6° brevi. Palpi maxillares 4-segmentati. Palpi labiales 3-segmentati et mentum transversum, eis *Bæoceræ* simillimi. Scutellum visibile, minutum. Elytra striâ subsuturali integrâ. Coxæ mediæ et posticæ magis distantes quam in *Toxidio*, minus distantes quam in *Bæocerâ*. Meso-episterna a coxis mediis angustissime separata. Meso-epimera angusta, fere parallela, coxas medias fere (sed haud tote) attingentia. Metasternum a meta-episternis suturâ integrâ, haud interruptâ vel obsoletâ, separatum. Segmentum ventrale primum elongatum, laminis distinctis post coxas posticas haud munitum.

Body laterally compressed, as in *Toxidium*. *Eyes* not emarginate in front. *Antennæ* (Plate **22**, fig. 30 *a*) 11-segmented, with the 5 terminal joints somewhat asymmetrically dilated and having the long hairs less definitely arranged in whorls than in the species of *Toxidium*, etc., described above; characterised by the very short 8th segment, less than ½ the length of 7 or 9, also by the 6th segment being considerably shorter than 5, and 4 a very little shorter than 3. *Maxillary palpi* 4-segmented (see Plate **22**, fig. 30 *b*). *Labial palpi* (Plate **22**, fig. 30 *c*) 3-segmented, and *mentum* transverse, closely resembling those of *Bæocera*. *Scutellum* a minute, rather broad, triangle. *Elytra* with subsutural stria complete, reaching the base, slightly sinuous in front, *i.e.* bending a little towards the suture just posterior to the base, and at the base curving outwards and reaching the base of the elytron at the side of the mid-basal projection of the prothorax: traces of a second stria, obsolete in front, are faintly visible outside the subsutural stria. *Wings* fully developed. *Anterior coxæ* prominent and contiguous; *middle coxæ* rather wider apart than in *Toxidium*, but less so than in *Bæocera*; *hind coxæ* a little nearer together than the middle pair. *Meso-episterna* (Plate **22**, fig. 29) separated from the mid-coxal cavities by a longitudinal suture; *meso-epimera* distinct, narrow, almost parallel-sided, tapering at the inner extremity, which almost but not quite reaches the coxal cavity. Suture separating the *meta-episternum* from the *metasternum* distinct throughout the whole length of the latter: metasternum without longitudinal ridges in front of the hind coxæ (cf. *Toxidium seychellense*, p. 227). No *post-coxal plates* are separated off behind the hind coxæ, but the hind margin of the acetabulæ of these coxæ bears coarse, elongate punctures, though none are present behind the middle coxæ. 1*st ventral abdominal segment* elongate: the number of ventral segments cannot be told accurately owing to their retracted condition. I have not made microscopic preparations of the *tarsi*, but under the highest power available for opaque objects they appear as follows: *front tarsi*, segments 1—3 subequal, 4 a little shorter, 5 about equal to 3 and 4 together: *middle tarsi*, 1 nearly equal to 2 and 3 together, 2 a little longer than 3, 3 and 4 subequal, 5 a little less than 3 and 4 together: *hind tarsi*, 1 elongate, about equal to 2 and 3 together, 2 and 3 subequal, 4 a very little shorter, 5 rather less than 3 and 4 together.

I have felt compelled to erect a new genus for this tiny insect, which is in some respects intermediate between *Toxidium* and *Bæocera*. The compressed form is that of *Toxidium*, but the labial palpi and mentum are those of *Bæocera*. The subsutural stria reaching the base of the elytron, and the form of the meso-epimera (though they almost reach the coxæ),

also recall *Bæocera*. In the distance apart of the coxæ *Nesotoxidium* is intermediate between the two. The short 6th and 8th antennal segments, presence of scutellum, and traces of a second stria outside the subsutural stria, are also distinctive characters.

Type of the genus, *Nesotoxidium typicum*, sp. n.

That *Nesotoxidium* is quite a distinct genus was confirmed by Mons. Achard, to whom specimens and drawings were shown, and who knew nothing like it. It is possible that *Toxidium integrum*, Reitter (East Africa, *Wien. Ent. Zeit.* 27. 1908, p. 34) should be placed in this genus, as Reitter describes it as having the subsutural stria entire, reaching the base of the elytra, and traces of a second stria outside the subsutural stria. It is just possible that it is actually the same species as *Nesotoxidium typicum*, a question which cannot be decided from Reitter's description. Even were it so, the erection of the new genus would not be invalidated.

22. *Nesotoxidium typicum*, sp. n.

(Plate **22**, figs. 28, 29, 30, *a—c.*)

Politum, supra omnino glabrum et impunctatum, piceo-nigrum, fasciâ obscurâ, rufescente, trans medium elytrorum; pedibus antennarumque basi rufescentibus. Long. corp. fere 1·2 mm.

Shining pitchy blackish, with an obscure reddish band, interrupted at the suture, across the middle of the elytra (one specimen is entirely lighter reddish, except base of prothorax and base of elytra narrowly black, and apex of elytra more widely black): legs, feet, and basal segments of antennæ reddish. Upper surface quite glabrous and impunctate; lower surface impunctate (except for the punctures behind the hind coxæ); metasternum bearing fine, pale, decumbent hairs, rather conspicuous in the middle part.

4 specimens.

Loc. Seychelles: Silhouette, Mahé, Praslin. Silhouette, near Pot-à-eau, ca. 1500 feet, viii. 1908. Mahé: Cascade Estate, between 800 and 1500 feet; forest behind Trois Frères, about 2000 feet, i. 1909. Praslin: Coco-de-Mer forest in the Vallée de Mai, xi. 1908.

Phalacridæ.

The collection contains five forms belonging to this family, referable to four genera, and each represented by a considerable series of specimens. All are from the Seychelles proper, and almost exclusively from the endemic mountain-forests at elevations above 1000 feet (only the two species of *Nesiotus* were taken both in these forests and in cultivated places at low elevations): and all are small or minute, even for this family of small insects. After much study, and searching through all the material in the collections in London and Paris, I have had to describe all as new species, and have erected one new genus (*Phalacratomus*). As to affinities, *Stilboides angulicaput* seems to be a quite distinct form, referable however to a genus originally described to include two Neotropical species. *Parischius seychellensis* belongs to a genus containing two other species, both from Madagascar, and it is very close to one of those two species. *Nesiotus tropicus* and *N. similis* belong to a genus the type of which (*N. olibroïdes*) was described from Madagascar, while *N. tropicus* itself occurs in Madagascar as well as in the Seychelles. The new genus,

Phalacratomus, is a very isolated form: the only genus to which it appears to be at all related is the Central American *Liophalacrus*, Sharp, and the resemblance lies only in some characters, while there is considerable divergence in others. One species of *Phalacratomus* was found in the Seychelles, and there is another (undescribed) from Madagascar in the Paris Museum.

Three out of the four genera represented in the Seychelles material were erected by Guillebeau. I was unable to place several of the species in their respective genera until I had studied Guillebeau's collection, which is now in the possession of the Société entomologique de France. My cordial thanks are due to the officers of the Société entomologique for the facilities afforded me, especially for the loan of a number of specimens, which I have thus been enabled to compare closely with those from the Seychelles. It is to be regretted that Guillebeau's painstaking work * is not illustrated by any figures, since simple drawings of anatomical points throw much light on many of the characters which he uses in founding genera. It may also be doubted whether the characters used are in all cases sufficient to justify the erection of separate genera†. This, however, is a matter of opinion, and nothing decisive can be said till a careful revision of the family is undertaken, with larger material than he had in most cases at his disposal.

The following anatomical points call for comment:

(i) **Antennæ.** The antenna is figured in all of the Seychelles forms. Except perhaps in the case of *Phalacratomus exiguus* no very marked differences of form or relative lengths of the segments are apparent: but judging from some of the non-Seychellean species used for purposes of comparison, more marked differences in this respect do sometimes occur. One cannot fail to be impressed with the manner in which the antennæ are articulated to the head. As the figures show, the articulation is not in line with the long axis of the antenna, but is effected by means of a knob-like portion of the basal segment, projecting almost at right angles to the long axis (text-figs. 1, 3, 5): the rounded ending of the long axis is quite free. Casey (*Memoirs*, vii. 1916, p. 56) refers to this structure of the basal segment, but it is not clear from his statement that the whole attachment to the head is by means of the knob-like projection, and that the rest of the segment is free, a condition which is quite distinct when preparations in balsam, of antennæ both attached to, and detached from, the head, are examined. Such preparations have been made and studied in all the five Seychelles species. The same structure appears to prevail in examples of the following genera which I have examined as opaque objects under the highest power possible: *Phalacrus, Olibrus, Eustilbus, Tolyphus, Eulitrus, Acylomus, Litolibrus, Heterolitus, Litochrus.* It is probably general throughout the family, except possibly in

* The works of Guillebeau specially referred to are: "Descriptions de quelques espèces de la famille des Phalacridæ de la collection de M. Antoine Grouvelle" (*Ann. Soc. ent. France*, 63. 1894, pp. 275—310), in which keys of the divisions and genera are given, and a number of new genera described; and "Descriptions de Phalacridæ recueillis par M. Ch. Alluaud dans le Nord de Madagascar, en 1893" (*Bull. Soc. ent. France*, 1896, pp. 296—299).

† *Cœlocœlius*, Guilleb. (1894) must become a synonym of *Acylomus*, Sharp (1888). While comparing representatives of a number of genera, I have had before me examples "ex typis" of *C. simoni*, Guilleb., the type of the genus *Cœlocœlius*, and of *Acylomus aciculatus*, Sharp, the type of the genus *Acylomus*. In all generic characters they are identical. The two species *simoni* and *aciculatus*, both of which are Neotropical, are probably quite distinct.

Liophalacrus, the antennæ of which are very different from those of the other genera, and appear to be articulated almost directly in continuation of the long axis (as far as can be seen without making a preparation in balsam); see remarks on *Liophalacrus* below, p. 242.

(ii) **Tarsi.** These have been defined as 5-segmented, with the 4th segment small and sometimes hard to discern. This is certainly the case, when the minute penultimate segment is present at all. But, again, the examination of balsam-preparations shows that it is sometimes entirely absent, in which case the tarsus is 4-segmented. Sometimes only the posterior tarsi are 4-segmented, but in *Phalacratomus exiguus* and in *Parischius seychellensis* all three pairs are 4-segmented. In *Nesiotus tropicus* all three pairs are 5-segmented in the ♀, while the ♂ is heteromerous, its formula being 5, 5, 4. In *Stilboides angulicaput* the condition is heteromerous, the formula being 5, 5, 4: the specimens of this species are few and their sex has not been determined, so I cannot say whether the heteromerous condition is confined to one sex or not. Thus within the limits of the five Seychelles Phalacridæ three different tarsal formulæ are found, two of them occurring (in one case at any rate) in the two sexes of the same species.

The occurrence of the heteromerous condition in the ♂ alone is found in very many clavicorn beetles, particularly Cryptophagidæ and Cucujidæ, but I am not aware that it has been previously recorded in Phalacridæ. Westwood illustrated it in the South American Cucujid *Palæstes bicolor*, Perty (=*freyersi*, Heyden): see Introd. i (1839), p. 149, fig. 12 (17—18)*.

The Seychelles Phalacrids also illustrate the remarkable diversity in the form and relative lengths of the segments in the hind tarsi, of which considerable use has been made in the classification of the family. The front and middle tarsi are usually much alike, even when the hind tarsi are very different: but in *Parischius seychellensis* the middle tarsi differ both from the front and hind pairs, being intermediate as regards the length of the basal segment.

(iii) **Wings.** No case of reduction of the metathoracic wings has been observed in the Phalacridæ under review.

(iv) **Mesosternum.** This has been defined as either entirely covered by the metasternal lobe, or at most only forming a narrow border in front of this. But in *Phalacratomus* and in the Central American *Liophalacrus*, Sharp, it is developed as a much larger, pentagonal piece: see remarks under *Phalacratomus*.

(v) **Metasternum, subfemoral lines, etc.** The "*metasternal lobe*" or "*metasternal process*" is that process which in most Phalacrids projects forward between the middle coxæ, almost or quite concealing the mesosternum. The term "*subfemoral lines*" designates the arcuate or angular lines, absent in some forms, into which the marginal stria of the metasternal lobe is continued on either side behind the middle coxæ. Guillebeau and Ganglbauer employ this term, but Casey refers to them as the "margins of the post-mesocoxal plaques."

* I am told that many Malacoderms are also heteromerous in the ♂ sex only, but in this case the front tarsi are reduced to four segments.

This heteromery in one sex recalls another curious sexual difference, occurring in the endemic Seychellean genus of Hydrophilidæ *Bourdonnaisia*, one species of which, *B. mahensis*, has the antennæ 8-segmented in the ♂, 9-segmented in the ♀. See *Tr. Linn. Soc. London*, Ser. 2 (Zool.), xvi. pp. 213—16, pl. xiv. fig. 13 (1913).

(vi) **Secondary sexual characters.** Excepting the heteromerous condition of the tarsi, confined to the ♂ sex, in *Nesiotus* (see above), no other secondary sexual characters have been detected in the material under review. Had time and material allowed of dissection of a greater number of specimens, possibly a similar difference might have been revealed in the *Stilboides*, or even in the other forms, though there is no *a priori* reason why this should be so. Among European species, Ganglbauer refers to secondary sexual characters in the ventral abdominal segments of *Tolyphus*, in the clypeus and mandibles of *Phalacrus* spp., and in the ventral abdominal segments and sculpture of the upper surface in *Olibrus* spp. Casey mentions, among American forms, sexual differences in the hind tibiæ in *Acylomus*, and in the ventral abdominal segments in *Eustilbus* spp. Other examples could probably be cited.

STILBOIDES, Guillebeau, *Ann. Soc. ent. France*, lxiii. 1894, pp. 282, 306.

This genus was defined to include two species described by Guillebeau (*op. cit.*, pp. 306, 307), *S. sublineatus* from Santo Domingo, and *S. grouvellei* from Brasil (Bahia) and Havana. I have had a specimen of the latter species before me. In *Stilboides* the process of the *prosternum* between the front coxæ is truncate behind, not curved dorsalwards, and has the hind margin setose. The *metasternum* projects forwards between the middle coxæ as a process, truncated in front, with a narrow margin, which is however a little wider along the front than at the sides. The *subfemoral lines* behind the middle coxæ are angularly produced backwards to about half the distance between the middle coxæ and the hind margin of the metasternum. The second segment of the *hind tarsi* is stated by Guillebeau (*op. cit.*, p. 282) to be two to three times the length of the basal segment: in the specimen of *S. grouvellei* before me I have made a balsam-preparation of the hind tarsus, and find the second segment to be just about twice the length of the basal segment. In *Stilboides angulicaput* the tarsi have been found to be 5-segmented in the front and middle pairs, 4-segmented in the hind pair, but whether this heteromery occurs in both sexes or in only one has not been determined. The *elytra* are punctate, the punctures having a more or less distinct seriate arrangement: and there is a subsutural stria abbreviated in front.

The following species from the Seychelles is referred to this genus as it agrees with Guillebeau's species closely in all the structural points mentioned above, excepting one. In *S. angulicaput* the second segment of the hind tarsus is less than twice the length of the basal segment (though it is more than $1\frac{1}{2}$ times the length of that segment): in this respect it is nearer certain species of *Eustilbus* which I have examined, and it also resembles them in the form of the prosternal process, and in having the subfemoral lines angular. But in those species of *Eustilbus* the metasternal process is differently formed, having a much broader front marginal piece (*i.e.* part of the mesosternum?), and the elytra are much less strongly punctate*. *S. angulicaput* agrees with *S. grouvellei* much more closely than

* The examples of *Eustilbus* examined are: specimens of *Eustilbus atomarius*, L. (= *piceus*, Steph.) ex coll. Sharp, from the British Museum, and examples of the same species from the Crotch British collection at Cambridge; also an example in the British Museum from Mexico City, determined by Dr Sharp as *E. apicalis* (Melsh.). In the last-named specimen the angular production of the subfemoral lines reaches nearly to the hind margin of the metasternum, and the lines themselves are interrupted at the apex of the angle.

with any other Phalacrid which I have seen, and I have no hesitation in referring it to the same genus, despite the difference in the relative lengths of the segments of the hind tarsus, which renders necessary a slight modification in the definition of the genus.

23. *Stilboides angulicaput*, sp. n.

(Plate **22**, figs. 33, 34 : text-fig. 1.)

Valde convexus, supra omnino niger, corpore subtus, antennis pedibusque rufescentibus; capite angulis anticis argutis, lateribus fere rectis, subparallelis, margine anteriore utrinque super antennæ basin emarginato; capite prothoraceque tenuissime punctatis; elytris punctis maioribus, perparum profundis, seriatim dispositis, lineâ basali tenui, striâ subsuturali distinctâ antice obsoletâ; prosterno inter coxas anticas sat lato, postice setoso; metasterno inter coxas medias late producto, antice truncato et tenuiter marginato; lineis subfemoralibus postice angulatim productis; segmento primo abdominis medio longitudinaliter elevato sed haud argute carinato; tarsis anticis et mediis 5-segmentatis, segmento 4° minuto; tarsis posticis 4-segmentatis, segmento basali sat curto, 2° quam basali magis quam sesquilongiore. Long. corp. 1·6 mm.*

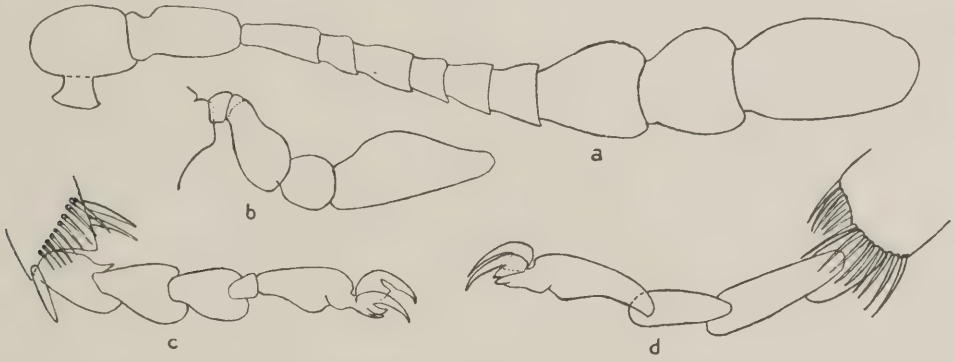


Fig. 1. *Stilboides angulicaput*: *a*, antenna; *b*, maxillary palp; *c*, front tarsus; *d*, hind tarsus. All from balsam-preparations, × circa 197.

Strongly convex, highly polished, glabrous above; entirely black above (the front of the head in one specimen obscurely reddish), underside, antennæ and legs rather dark reddish, club of antennæ not infuscate. *Head* (Plate **22**, fig. 33), emarginate on either side over the base of the antenna (in the figure the emarginations are not shown as the head is somewhat deflexed); when drawn out it is seen to have the front angles marked and sides nearly straight and parallel. *Antenna* as in text-fig. 1 *a*: *maxillary palp*, fig. 1 *b*. *Head* and *prothorax* excessively finely and rather obsoletely punctured, the punctures separated usually by about two or more times their own diameter: the prothorax produced backwards in a curve in the middle of the base, with hind angles nearly right angles. *Elytra* with the entire surface excessively finely transversely striolate (this striolation only distinctly visible under a $\frac{2}{3}$-inch objective); with series of large, extremely shallow punctures, becoming obsolete in about the anterior quarter of the length, with a few fine longitudinal striæ extremely faintly indicated, and with scattered excessively fine punctures; with a fine basal line, running very close to and parallel with the hind margin of the prothorax,

* In all the species measurements are taken from specimens with the head much retracted.

turning sharply at the inner end and running parallel with the side of the scutellum, and ending at about the level of the apex of the scutellum, and with a marked subsutural stria extending from the apex to about $\frac{1}{3}$ the length of the elytron from the base. *Wings* fully developed. *Prosternum* forming a rather broad process between the coxæ, the hind margin of this process bearing about three short setæ (broken off in some examples). *Metasternum* (Plate **22**, fig. 34) forming a broad process between the middle coxæ, truncate with rounded angles and finely margined in front: *subfemoral lines* (Plate **22**, fig. 34, S. F. L.) angular, the apex of the angle produced: middle part of metasternum rather densely pilose. 1*st ventral abdominal segment* with a median longitudinal elevation, but not a sharp carina. *Tarsal formula* 5, 5, 4: *anterior tarsus* (text-fig. 1 *c*) and *middle tarsus* with a very small 4th segment: *posterior tarsus* (text-fig. 1 *d*) with basal segment rather short, segment 2 between $1\frac{1}{2}$ times and twice as long as the basal. No *external sexual distinction* has been remarked, and the sex of the examples is not determined.

Loc. Seychelles. Silhouette, forest above Mare aux Cochons, over 1000 feet, ix. 1908, 7 examples.

PARISCHIUS, Guillebeau, *Bull. Soc. ent. France*, 1896, p. 297.

This genus was erected to include two species from Madagascar, *P. alluaudi* and *P. perparvulus*, described by Guillebeau (*l.c.*). In the *hind tarsus* the basal segment is greatly elongated (see text-fig. 2 *d*), longer than the united lengths of all the other segments. Balsam-preparations of the front, middle, and hind tarsus in the Seychelles form (text-fig. 2 *b*—*d*) show that all the tarsi are 4-segmented; in the front tarsus segments 1—3 are subequal in length, in the middle tarsus segment 1 is longer than segments 2 and 3 together, in the hind tarsus segment 1 is very long, as stated above. The *metasternum* projects forward between the middle coxæ as a process broadly rounded in front and very finely margined: there are *subfemoral lines* some distance behind the mid-coxal cavities, they are gradually curved (not angular), resembling those of *Nesiotus*; the *mesosternum* is not

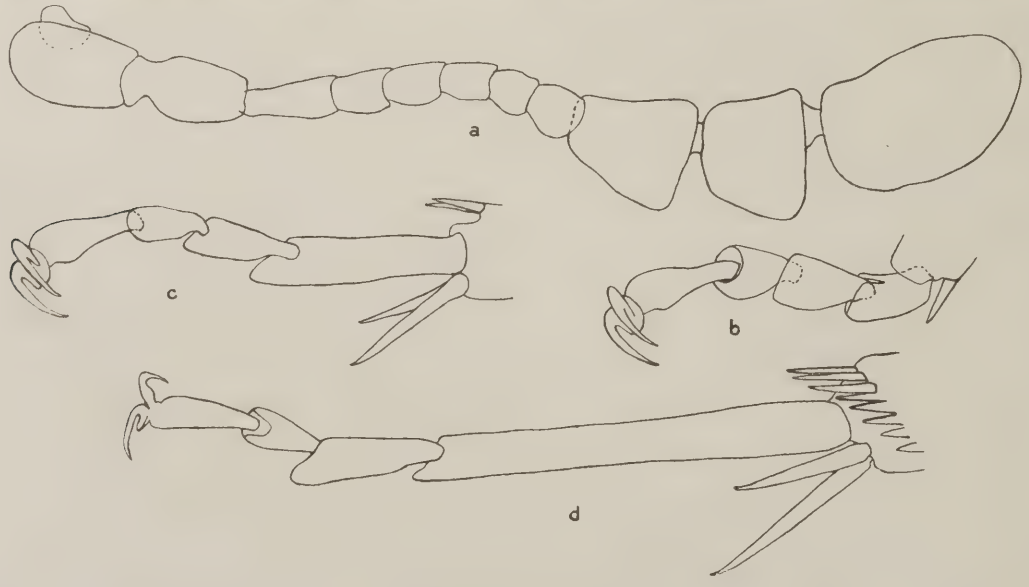


Fig. 2. *Parischius seychellensis*: *a*, antenna; *b*, front tarsus; *c*, middle tarsus; *d*, hind tarsus. All from balsam-preparations, × circa 197.

visible in direct ventral view: the *prosternal process* is curved dorsalwards behind the front coxæ. The *hind coxæ* are very broad (in an antero-posterior direction) and do not appear to have their hind margins closely soldered to the 1st abdominal segment*.

24. *Parischius seychellensis*, sp. n.

(Text-fig. 2.)

Parischio alluaudi affinis, sed minor, magis convexus, elytris postice magis angustatis. Long. corp. 1·7—2 mm.

I have had before me three examples of *P. alluaudi*, including two co-types, for comparison and find that the Seychelles specimens differ from that species in their smaller average size, greater convexity of shape, and in having the outline of the elytra more tapering: it narrows gradually in the posterior $\frac{3}{4}$ of their length. The excessively fine and close punctuation of the elytra is also a very little stronger, in some specimens at least of *P. seychellensis*, than in *P. alluaudi*. *P. perparvulus*, Guilleb., is a very much smaller form. There are two other forms in Guillebeau's collection, represented by single examples, labelled by him as belonging to this genus, though I do not know where they were described. They are *P. grouvellei*, from Annam, resembling *alluaudi* rather closely in size and colour, and much less tapering behind than *seychellensis*: and *P. basalis* from Zanzibar, much larger and differently coloured, different in several ways from both *alluaudi* and *seychellensis*. *Hind wings* of *P. seychellensis* fully developed.

Guillebeau (*l.c.*) described four distinct colour-forms in *P. alluaudi*. *P. seychellensis* varies in the same way, and among 26 examples examined (the remaining three are gummed on their backs), the following six forms are distinguishable:

A. Entirely ferruginous or reddish-testaceous. 7 specimens.

B. Ferruginous with a diamond-shaped black mark in the middle of the elytra; half is on either elytron, and the diamond is formed when the elytra are closed; the front point of the diamond sometimes reaches nearly to the scutellum, but the hind-point does not reach the apex of the elytra. 5 specimens.

C. Ferruginous with the diamond-shaped mark and also with a black basal band across both elytra. The diamond and the band are usually united along the suture, but not always. 7 specimens.

D. Ferruginous, with broad black basal band across both elytra, extending back a little along the suture, but the diamond-shaped mark is quite absent. 1 specimen.

E. The diamond and the basal band are expanded, so that the diamond reaches the side margins of the elytra: the band and diamond are broadly joined along the suture, and

* Stress was laid by Guillebeau (*l.c.*) on this character, that the hind margins of the hind coxæ are free, not soldered to the 1st abdominal segment, in *Parischius* and certain other genera. In several specimens which I have examined, of *Parischius*, *Nesiotus*, and *Phalacratomus*, this is undoubtedly the case: the hind margins of the coxæ are detached from the first ventral segment and lie in a different plane. But I am a little doubtful as to how much value this condition of the coxæ has as a generic character. Possibly the attachment of the coxæ to the segment is merely very weak, so that the segment shrinks away from the coxæ during the process of desiccation.

also by a narrow black band along the side margin, so that the whole of each elytron is black, except a spot in the basal part, and the apical part. 4 specimens.

F. The basal pale spot mentioned in the preceding form appears to have expanded, and the black portions are much less sharply defined, being only recognisable as a dusky suffusion. The result is an approach again to the unicolorous reddish form A. 2 specimens.

There is a certain amount of variation within the limits of these forms, and a few examples are transitional, and difficult to place definitely under one head. But on the whole the forms are well marked. There is no evidence of any one form being confined to a particular island or locality, or occurring in one particular season.

The *antennæ* and *tarsi* of *P. seychellensis* are figured. The sex of the example from which the tarsi are drawn has not been determined.

Loc. Seychelles; Silhouette, Mahé, Praslin. Silhouette: near Mont Pot-à-eau, about 1500 feet, and forest above Mare aux Cochons, over 1000 feet, viii—ix. 1908. Mahé: from grass in cultivated country at about 1000 feet, xii. 1908 (1 example); forest above 1000 feet at Cascade Estate, i. 1909; Mare aux Cochons district, about 1500 feet, i—ii. 1909. Praslin: Côtes d'Or Estate (Coco-de-Mer forest), xi. 1908.

Nesiotus, Guillebeau, *Bull. Soc. ent. France*, 1896, p. 298.

This genus was erected by Guillebeau to receive one species, *N. olibroïdes*, described by him (*l.c.*) from Madagascar. The two following species are referred to it after comparison with a co-type of *N. olibroïdes* lent from the Paris Museum. The *prosternal process* (between the front coxæ) is truncate behind, not bent dorsalwards, and has a short seta at either hind angle (these setæ are often broken off). The *metasternum* projects forwards between the middle coxæ as a process either rounded or subtruncate in front: the *mesosternum* is concealed, except for a fine margin round the metasternal process, which is apparently part of it. There are *subfemoral lines* some distance behind the mid-coxal cavities, but they are gradually curved, not in the least angular (see Plate **22**, fig. 36). The *hind coxæ* have their hind margins not closely soldered to the first ventral segment (definitely free in most of the specimens examined (see footnote, p. 235)). Guillebeau defined the 2nd segment of the *posterior tarsi* as 3 times the length of the basal: in the two following species it is only $1\frac{1}{2}$ times to twice the length of the basal segment. Despite this discrepancy, however, it seems best to include the two following species in *Nesiotus*, as they very closely resemble *N. olibroïdes* in general form and in all the characters of the sterna mentioned above. Moreover, in insects so minute it is very difficult to measure the proportionate lengths of the tarsal segments without making balsam-preparations of the tarsi, which Guillebeau does not seem to have done. From my examination of the co-type of *N. olibroïdes* I could not state the exact proportions of the lengths of the segments, and such a character might also vary within certain limits among the species of a genus. As stated elsewhere the tarsi are heteromerous in the ♂ sex of *N. tropicus*, the formula being 5, 5, 4 in the ♂; 5, 5, 5 in the ♀. *N. similis* is known only in the ♀ sex, and in *N. olibroïdes*, Guilleb., the material is insufficient for study of this point.

In the form of the metasternal process and subfemoral lines *Nesiotus* resembles *Parischius*, Guilleb.; but in that genus the prosternal process is bent dorsalwards at its extremity, and the tarsal structure is entirely different. Among representatives of other genera which I have examined, *Eulitrus estriatus*, Sharp (Central America), has the same kind of subfemoral lines, and its metasternal process is the same shape, but there is scarcely any visible margin formed by the mesosternum to this process.

25. *Nesiotus tropicus*, n. sp.

(Plate **22**, fig. 36: text-fig. 3.)

Sat longe ovatus, postice conspicue angustatus, apice subtruncato; supra omnino niger, elytrorum apice dilutiore; corpore subtus, antennis pedibusque rufescentibus; capite angulis anticis obtusis, rotundatis, margine anteriore utrinque super antennæ basin sinuato; capite prothoraceque tenuissime sat dense punctulatis; hoc et elytris marginibus lateralibus tenuiter reflexis; elytris punctis maioribus, sat sparsis, subobsoletis, subseriatim dispositis, lineâ basali tenui, striâ subsuturali distinctâ antice obsoletâ; processu prosternali inter coxas anticas modice lato, postice utrinque in angulo setâ minutâ instructo; metasterno inter coxas medias sat late producto, antice subtruncato et margine anteriore sat lato, crasso; lineis subfemoralibus curvatis, haud angulatim productis; tarsis anticis et mediis 5-segmentatis, segmento 4° minuto; tarsis posticis segmento 2° quam basali fere duplo longiore, in ♀ 5-segmentatis, segmento 4° minuto, in ♂ 4-segmentatis. Long. corp. 1·3—1·5 mm.

Rather long ovate, reaching its greatest width a little behind the humeral angles of the elytra, markedly narrowed behind, apices of the elytra subtruncate; moderately convex, highly polished above, colour uniform black, a little diluted in the translucent hind part of the elytra and the sides of the prothorax; underside reddish, legs and antennæ reddish to yellowish, clubs of the latter not infuscate. *Head* (text-fig. 3 *c*) with front margin sinuate on either side above the base of the antenna, bluntly produced and deflexed in the middle, the angles immediately outside the eyes obtuse (contrast *Stilboides angulicaput*). *Antenna* and *maxillary palp*, see text-fig. 3 *a*, *b*. *Head* and *prothorax* extremely finely and rather closely punctured, the punctures irregularly dispersed, in some cases separated by little more than their own diameter. *Prothorax* and *elytra* with lateral margins finely reflexed, though this is only in part visible from directly above. *Elytra* with punctuation not easy to discern clearly, punctures larger than those on the prothorax, subseriately arranged, separated by several times their own diameter; longitudinal striæ faintly indicated, basal line fine, subsutural stria distinct behind, obsolete in about the anterior $\frac{1}{3}$ of the length. *Wings* fully developed. *Prosternal process* truncate behind, bearing a very short seta at either end of its hind margin (these setæ often broken off). *Metasternal process* (Plate **22**, fig. 36, M. L.) subtruncate in front, having a broad, thickened front margin bearing several short setæ at either angle: *subfemoral lines* curved, not angular: metasternum nearly bare in the middle in front, setose behind. *1st abdominal segment* very little elevated in the middle.

Tarsi. The examination of the hind tarsi, mounted in balsam, under a $\frac{1}{6}$-inch objective, led to the discovery that, while the front and middle pairs are 5-segmented in both sexes (text-fig. 3 *d*), the hind tarsi are 5-segmented in the ♀ (text-fig. 3 *f*), but 4-segmented in

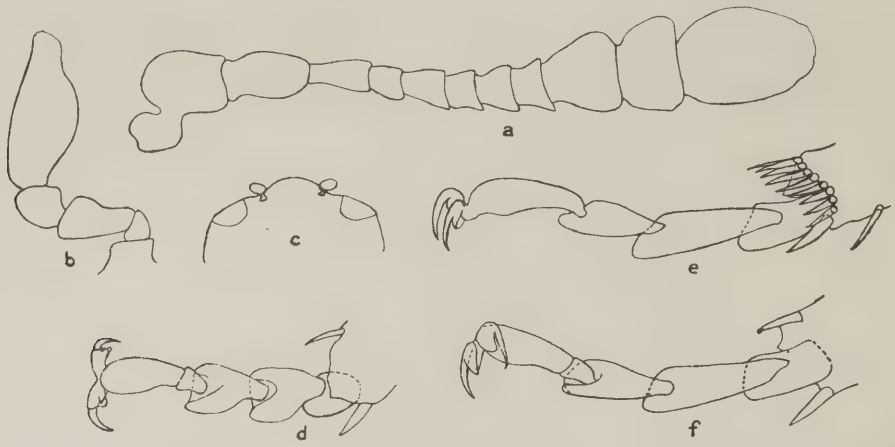


Fig. 3. *Nesiotus tropicus*: *a*, antenna; *b*, maxillary palp; *c*, outline of head, eyes, and basal segments of antennæ; *d*, front tarsus; *e*, hind tarsus of ♂ (4-segmented); *f*, hind tarsus of ♀ (5-segmented). All from balsam-preparations; *a*, *b*, *d*, *e*, and *f* × circa 197; *c*, × circa 38.

the ♂ (text-fig. 3 *e*). The penultimate (= 4th) segment in the ♀ is very small and almost continuous in outline with the terminal segment, while in the ♂ the articulation and the slight constriction between the two have entirely disappeared. No other external sexual character has been observed, and the number of tarsal segments can scarcely ever be reliably counted except from balsam-mounts. The true condition was discovered by determining the sex of a number of individuals from their genitalia, and then detaching and mounting their hind legs and tarsi (many ♀ had the oviposition and vaginal palpi exserted, and the ♂ were determined by dissecting out the œdeagus). 6 ♀ and 3 ♂ were examined in this way. The hind tarsi of two other examples (♀) were also mounted, without previous determination of the sex. The 2nd segment in both sexes is between $1\frac{1}{2}$ times and twice as long as the basal segment.

About 51 specimens.

Loc. Seychelles; Silhouette, Mahé, Praslin, Long Island, Round Island. Silhouette: forest near Mont Pont-à-eau, ca. 1500 feet; Mare aux Cochons, over 1000 feet; cultivated country near coast. Mahé: high forest of Morne Blanc; country above Port Glaud, 500—1000 feet; Cascade Estate, about 1000 feet; various localities near sea-level, including the marshy coastal plain at Anse aux Pins and Anse Royale. Praslin: Coco-de-Mer forest in the Vallée de Mai. Long and Round Islands, two coconut-planted islets off the coast of Mahé, a single example from each. This species was taken at many elevations, from the coast up into the endemic forests, and at all seasons from July 1908 to Feb. 1909.

Two specimens from the Paris Museum, obtained by Alluaud in Mahé (1892), are referred to this species.

Madagascar: six examples in the Paris Museum, from Nossi Bé, Diego Suarez, and Tananarive, are provisionally referred to *N. tropicus*. Almost undoubtedly most of them belong to it, but minute examination of their structure might indicate that one or two specimens are referable to *N. similis*.

Réunion: one example from the Paris Museum (Alluaud, 1893) is doubtfully placed here; it is almost uniformly dark rufous in colour, and markedly tapering behind. It may prove to belong to a distinct species.

26. *Nesiotus similis*, n. sp.

(Plate **22**, fig. 35: text-fig. 4.)

Nesioto tropico simillimus, sed maior, elytris fortius ac densius punctatis, tarsis posticis (in ♀) segmento 2° longiore, segmentis 3—5 æquilongo. Long. corp. 1·5—1·8 mm.

This form, known with certainty only in the ♀ sex, is extremely like *Nesiotus tropicus*, so much so that considerable difficulty was experienced in separating the two, and I am uncertain whether *N. similis* should be regarded as a subspecies of *N. tropicus* or as a separate species. The structural difference lies in the form of the *hind tarsi* of the ♀ (text-fig. 4*b*): segment 2 is just over twice the length of the basal segment; it is proportionately longer than in *N. tropicus*, being as long as segments 3—5 taken together, while in *N. tropicus* it is distinctly shorter (cf. text-fig. 3*f*). Otherwise the hind tarsi are closely similar to those of *N. tropicus*, being 5-segmented with the 4th segment very small: those

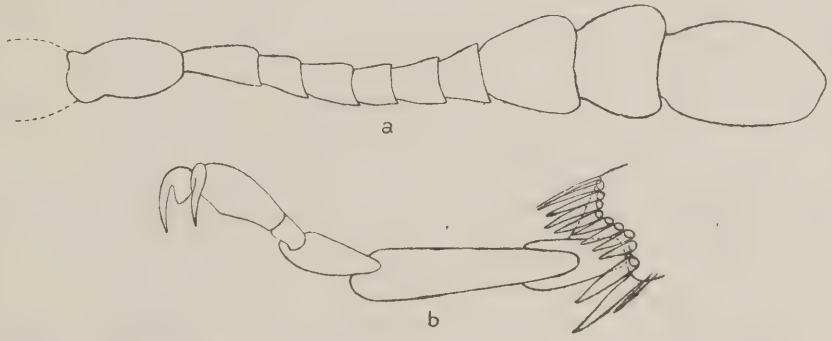


Fig. 4. *Nesiotus similis*: *a*, antenna; *b*, hind tarsus. Both from balsam-preparations, × circa 197.

of 5 individuals were detached and mounted in balsam, the sex of 3 of these specimens being proved by their exserted ovipositors. Probably the hind tarsus of the ♂ has only 4 segments, as in *N. tropicus*, and a specimen from Rodrigues with 4-segmented hind tarsi, believed to be ♂, is referred with some hesitation to this form. It has the 2nd segment proportionately longer than in the ♂ of *N. tropicus*, though this greater length is not so noticeable as in the ♀. Besides this difference in the tarsi, the *average size* of *N. similis* is larger, and the *elytral punctuation* is markedly closer and stronger; the punctures are rather large and very shallow, with their greatest diameter lying in a transverse direction, they are separated by a distance only about equal to their own greatest diameter, and their seriate arrangement is more evident. In some specimens the *metasternal process* has a slightly narrower margin than in *N. tropicus* and tends to be less nearly truncate, slightly more rounded in front: but I doubt whether this holds as a constant character. In general form and colour, structure of antennæ, form of subfemoral lines, basal elytral stria and subsutural stria, etc., *N. similis* closely resembles *N. tropicus*. *Hind wings* fully developed

In size and punctuation the specimens referred to *N. similis* closely resemble the co-type of *N. olibroïdes*, Guilleb., which I have before me. The latter is lighter and more rufous in colour, which may however be due to immaturity. Its *metasternal process* is, however, markedly wider than in either *N. similis* or *N. tropicus*, subtruncate in front and more definitely angled at either side, and only very finely margined. As stated above, in the remarks on the genus, I have not made a balsam-preparation of the hind tarsus in *N. olibroïdes*, and cannot accurately estimate the relative lengths of the segments, but if Guillebeau's definition that the 2nd segment is three times the length of the basal segment is correct, this constitutes another structural character separating *N. olibroïdes* from *N. similis* and *N. tropicus*.

14 specimens.

Loc. Seychelles: Silhouette, Mahé, Anonyme I. Silhouette: near Pot-à-eau, about 1500 feet, and Mare aux Cochons, over 1000 feet, viii.—ix. 1908. Mahé: near Morne Blanc, about 1000 feet, and above Port Glaud, 500—1000 feet, x. 1908. Anonyme Island, a coconut-planted islet off the coast of Mahé, one example, i. 1909.

Rodrigues: two specimens (Snell and Thomasset, viii.—xi. 1918), one of which is ♂, are referred to this species with some hesitation.

Two examples from the Paris Museum, obtained by Alluaud in 1892 in Mahé and La Digue respectively, are referred to this form on the ground of their larger size and stronger punctuation, though I have not examined the tarsi.

Madagascar: see remarks under *N. tropicus*.

Phalacratomus, gen. nov.

Breviter ovatus, valde convexus. Caput margine anteriore utrinque super antennæ basin leviter sinuato, ad latera antice haud angulatum. Antennæ 11-segmentatæ, sat longæ, clavâ parum laxâ, trisegmentatâ. Palpi maxillares segmento 4° ac tribus præcedentibus simul sumptis æquilongo, apice subtruncato. Prothorax lateribus tenuiter reflexis. Scutellum distinctum. Elytra striâ subsuturali nullâ, lineâ basali sub margine prothoracis celatâ, marginibus lateralibus tenuiter reflexis. Prosternum inter coxas processu angustissimo, postice haud setoso, munitum. Coxæ anticæ ovales, breviter et oblique transversæ. Mesosternum areâ pentagonali, scutiformi, basi inter coxas medias, instructum. Metasternum sine lineis subfemoralibus. Abdominis segmenta 5, basale haud medio carinatum. Tarsi omnes 4-segmentati; postici segmentis 2° et 3° brevibus, simul sumptis segmento basali vix longioribus.

Form (Plate **22**, fig. 37) rather shortly and broadly ovate, the greatest width being reached a little before the middle of the length of the elytra; very strongly convex; lateral margins of prothorax and elytra very finely reflexed. *Head* (text-fig. 5*c*) not or scarcely visible from above in repose, with front margin arcuate and deflexed in the middle, slightly sinuate on either side just within the eye (the sinuation is very little noticeable from above unless the head is much tilted up); there is no definite angle where the sides meet the front margin. *Antennæ* (text-fig. 5*a*) rather long, club rather loose. *Maxillary palp* (text-fig. 5*b*) with the 4th segment about as long as the 3 preceding segments together, subtruncate at apex. *Prothorax* excised in front to receive the head (see Plate **22**, fig. 38),

produced backwards in a curve in the middle of its hind margin, hind angles obtuse. *Scutellum* distinct. *Elytra* entirely covering the abdomen behind, with no subsutural or other striæ*; the fine basal line is normally hidden under the margin of the prothorax, and does not bend back along the sides of the scutellum. *Wings* fully developed, considerably longer than the elytra. *Prosternum* (Plate **22**, fig. 38) forming only a very narrow

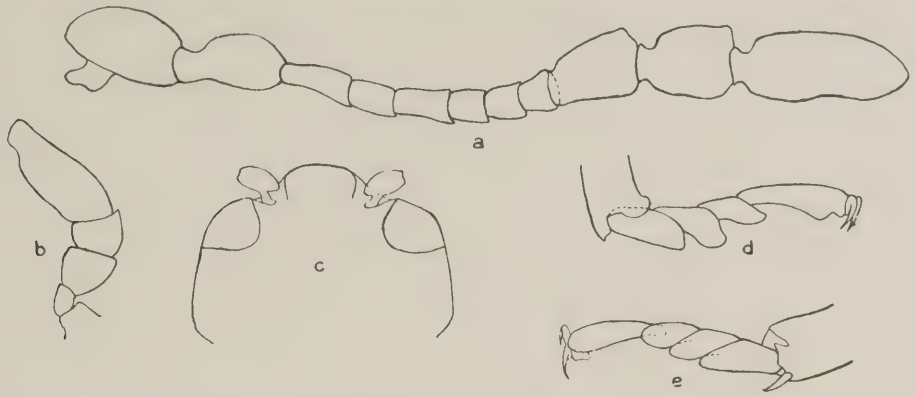


Fig. 5. *Phalacratomus exiguus*: *a*, antenna; *b*, maxillary palp; *c*, outline of head, eyes, and basal segments of antennæ; *d*, front tarsus; *e*, hind tarsus. All from balsam-preparations; *a*, *b*, *d*, *e* × circa 197; *c* × circa 67.

process between the closely approximated front coxæ; the hind margin of this process bears no setæ in any specimen examined: *front coxæ* not globular, but rather long-oval, their long axes set in an obliquely transverse direction. *Mesosternum* (Plate **22**, fig. 39, MES.) forming a conspicuous, pentagonal, shield-shaped, margined area, separated from the metasternum by a straight, transverse, sunk suture between the middle coxæ, while the apex of the pentagonal area projects in front of the coxæ: *middle coxæ* not globular, but shortly transverse, produced outwards to a narrow, tapering portion, not however extending as far as to be level with the side margin of the metasternum. *Metasternum* entirely without *subfemoral lines* (unless the raised margin at the back of the middle coxal cavity represents these); margined at the back, with a slight split in the middle (as in the other species examined) and an indication of a median longitudinal suture extending forwards from this: *hind coxæ* contiguous, extending the entire width of the metasternum; their hind margins free, not united to the first ventral segment (cf. footnote, p. 235). Visible *ventral abdominal segments* 5, the 1st without any median keel or elevation. *Tarsal formula* 4, 4, 4: segments 1—3 lobed beneath in all the tarsi: *anterior tarsus* shown in text-fig. 5*d*, and the *middle tarsus* resembles it: *posterior tarsus* shown in fig. 5*e*, the 2nd and 3rd segments are short, and taken together are but little longer than the basal segment†.

Type of the genus: *Phalacratomus exiguus*, sp. n.

The position and affinities of this genus appear very uncertain. The only genus that I have seen which seems related to it is the Central American *Liophalacrus*, Sharp (*Biol. Centr.-Am.*, Coleop. II. i. p. 255 (1888)). I have before me a specimen of *Liophalacrus bicolor*, Sharp, which resembles *Phalacratomus* in having the mesosternum developed as a

* Except the fine line delimiting the actual sutural margin of the elytron.

† In text-fig. 5*e* (hind tarsus) the segments are rather closely drawn up together, causing it to appear more different from the front and middle tarsi than is the case in actual structure.

conspicuous pentagonal piece, though in *Liophalacrus bicolor* this piece is not flat, but elevated along the middle and sloping dorsalwards on either side. *L. bicolor* agrees also in having no subfemoral lines on the metasternum, and in having the front and middle coxæ transverse, not globular, but its middle coxæ are very much more extended transversely than those of *Phalacratomus*, and reach to the lateral margins of the metasternum. *L. bicolor* differs entirely from *Phalacratomus* (and from other Phalacrid genera which I have seen) in the form of its antennæ, which have the basal segment very long and slender, the segments between this and the club very short, and the 3-segmented club forming a single compact body: [these antennæ seem to be only 10- or possibly 9-segmented, and to be articulated at the base in line with the long axis of the antenna, not at right angles to it, as in the antennæ figured in this present paper; but I have not made balsam-preparations of them, though I have examined them under the highest power possible without doing so—a magnification of some 90 diameters]. *Liophalacrus bicolor* also differs in having a raised longitudinal keel on the prosternum in front of the coxæ, a sharp median longitudinal keel on the 1st abdominal segment, in having on the hind part of the metasternum two ridges against which the hind femora must be applied when pushed forward, and in having (as far as can be seen without making balsam-preparations) 5-segmented tarsi.

Guillebeau states (*Ann. Soc. ent. France*, 1894, p. 275) that he had not seen the types of Dr Sharp's species: had he had opportunity to see that of *Liophalacrus*, that genus, with its conspicuous mesosternum, would probably not have been placed in the same section (Heterolibrini) with even such genera as *Litolibrus* and *Acylomus*. In fact, *Liophalacrus* and *Phalacratomus* necessitate some modification of existing definitions of the family Phalacridæ as a whole (*e.g.* Guillebeau's and Ganglbauer's (*Käf. Mitteleur.* iii. p. 739) definitions). Firstly, the family is defined as having front and middle coxæ globular; whereas in these two genera they are at least shortly transverse, and in *Liophalacrus* the middle coxæ are very much extended transversely. Secondly, the mesosternum in the family is said to be either entirely covered by the metasternal process, or at most only forming a narrow horizontal border in front of this; whereas in the two genera under discussion it is well developed as a pentagonal piece. In the form of the antennæ *Liophalacrus* may, as stated above, compel further modification of the definition of Phalacridæ.

27. *Phalacratomus exiguus*, sp. n.

(Plate **22**, figs. 37—39: text-fig. 5.)

Minutissimus, politus; obscure brunneus, capite et prothorace et parte posteriore elytrorum flavescentibus, vel interdum supra omnino nigrescens; subtus rufo- vel flavo-brunneus, antennis pedibusque flavescentibus, antennarum clavis infuscatis; capite prothoraceque fere obsolete tenuissime punctulatis; elytris punctis maioribus subobsoletis, sine striis; metasterno sparse piloso. Long. corp. 0·9—1·2 mm.

The structural characters are given in the description of the genus. The species is very minute, highly polished. Colour usually brownish-black, with head, prothorax, deflexed posterior part of elytra, and sometimes the reflexed lateral margins of the latter, yellowish-brown. In some examples the colour above is almost uniform black. Underside

lighter, yellowish- to reddish-brown. Legs and antennæ yellowish, clubs of antennæ usually infuscate. Head and prothorax with exceedingly fine and subobsolete punctures; the elytra have in addition larger subobsolete punctures showing indications of a seriate arrangement; but the whole punctuation is indistinct and difficult to make out. The elytra have neither subsutural nor any other striæ. The prosternal process is (as previously stated) not setose behind. The shield-shaped area of the mesosternum bears a few short hairs, and the metasternum is rather sparsely pilose, more densely on either side of the middle line at the back.

Var.? There are two exceptionally small examples (0·9 mm. long), both coloured a little differently from the majority. The prothorax is dusky yellowish, the elytra blackish, but paler, *i.e.* dusky reddish or yellowish, along the suture; in one of them this paler coloration is suffused over all the middle part of the disc of the elytra, and contrasts rather markedly with the black of the humeral and basal area. But although a microscopic preparation of antenna and tarsi has been made, no character has been detected sufficient to warrant their being regarded as specifically distinct.

33 examples.

Loc. Seychelles: Silhouette, Mahé. Silhouette, viii.—ix. 1908: near Pot-à-eau, about 1500 feet, and Mare aux Cochons and the forest above, some being from the higher elevations, near 2000 feet. Mahé: high forest of Morne Blanc and Pilot, ca. 2000 feet; Cascade Estate, various places in the forest, 800—1700 feet; Mare aux Cochons district, 1000—2000 feet. The Mahé specimens were taken at various times from Oct. 1908 to March 1909.

28. *Phalacratomus*, sp.

There is a specimen in the Paris Museum from Madagascar (Diego Suarez, Alluaud, 1893) belonging to this genus. It agrees closely with *P. exiguus* in all structural points, particularly the form of the sterna, etc. It is however larger, longer in proportion to its width, and has the elytra quite impunctate. Its head and thorax are coloured much as in *P. exiguus*; the elytra are reddish at the base, darker and more fuscous distally. It should doubtless be regarded as a distinct species of *Phalacratomus*.

Cucujidæ (Supplement).

The Cucujidæ have already been reported on by the late Antoine Grouvelle (*Trans. Linn. Soc. London*, Ser. 2, Zool., xvii. p. 141, Dec. 1914). One species, however, represented by a single example, was not sent to Grouvelle, since, owing to the heteromerous condition of its tarsi, it was erroneously sent to Herr Gebien among the Tenebrionidæ. It has a superficial resemblance to *Teredus* and certain other Colydiid genera, but differs from them structurally. I have not been able to place it in any genus in the British Museum, and Monsieur Lesne, who has seen it, has been unable to identify it with any named form in Grouvelle's collection at Paris. Probably it is a new species, and perhaps a new genus. Nevertheless, as I have no special knowledge of the family, and time does not allow of my searching the literature, I prefer not to name it, but to describe it as follows.

29. *Genus et species?*

Elongata, angusta, parallela, subcylindrica; lævis, fortiter polita, omnino glabra; piceo-nigra ore, antennis, pedibus, pygidio, piceo-rufis: capite ad oculos maximæ prothoracis latitudini æquilato, margine antico late truncato et utrinque leviter sinuato, sat fortiter haud densius punctato: antennis curtis, 11-segmentatis, ante oculos sub marginibus lateralibus capitis insertis, clavâ trisegmentatâ munitis: prothorace circa $\frac{1}{5}$ longiore quam latiore, maximam latitudinem ad angulos anticos attingente, postice angustato, angulis posticis omnino rotundatis, disco sat fortiter haud densius punctato: scutello late subtriangulari, haud punctato: elytris postice perparum dilatatis, humeris angulos fere rectos, apice rotundatos, formantibus, apice late rotundatis, pygidium haud tegentibus, striâ subsuturali antice obsoletâ (sed ad elytrorum basin serie punctorum continuatâ) et seriebus punctorum circa 8 aliis instructis: corpore subtus ut in *Aulonio* constructo: tarsis anticis et mediis 5-segmentatis, posticis 4-segmentatis. Long. corp. circa 3·9 mm.

Long, narrow, parallel-sided, subcylindrical: smooth, strongly shining, quite glabrous; pitchy black, the front of the head, antennæ, mouth-parts, pygidium, and legs pitchy reddish. *Head* short and broad, its breadth at the level of the eyes equal to the greatest breadth of the prothorax, narrowed and having sharp overhanging lateral margins in front of the eyes, broadly truncate and feebly bisinuate in front, rather strongly punctured, the punctures of different sizes and often two or more times their own diameter apart. *Antennæ* inserted in front of the eyes, and under the overhanging lateral margins of the head, short, 11-segmented, the basal segment almost entirely hidden from above by the lateral margin of the head, segment 3 nearly twice as long as broad, segments 4—8 short, the distal ones transverse, segments 9—11 forming a rather loose club. *Prothorax* about $1\frac{1}{5}$ times as long as broad, reaching its greatest breadth at the front angles, gradually narrowed to the base; front angles strongly deflexed, not visible from above, hind angles quite rounded off; lateral and posterior margins finely reflexed, front margin not reflexed but bearing a fringe of close, short, pale ciliæ; punctuation similar to that on the head. *Scutellum* rather broadly subtriangular, its sides arcuate, surface quite impunctate. *Elytra* broadening very slightly behind, a little wider in their widest part than head or prothorax; shoulders nearly right-angled but rounded off at the apex of the angle; at the posterior extremity the elytra are together broadly rounded (in the unique specimen they do not quite meet at the apex) and leave the pygidium exposed; the finely reflexed outer margin is only visible from above just at the hind end; there are no raised costæ, and no striæ except the subsutural stria, which is deeply impressed behind but vanishes in front at about $\frac{1}{3}$ the length of the elytron from the base, being continued forwards to the base as a series of punctures; between this subsutural series and the outer margin there are about 8 other series of punctures, but the outer 2 or 3 are hidden from above by the deflexion of the lateral part; there is also a short scutellar series at the base between the suture and the subsutural series; the intervals are quite flat but bear a few exceedingly fine punctures. *Hind wings* not examined. *Pygidium* extremely finely and closely punctured, with rounded margin. The *underside* structurally resembles that of the Colydiid *Aulonium* closely (*Aulonium sulcatum* has been used for comparison): that is, the *front coxæ* are separated by a narrow intercoxal process bent dorsalwards behind

them, and their cavities are closed behind by the side pieces of the prosternum; the *middle coxæ*, subrotund like the front pair, are also separated by a narrow intercoxal process of the mesosternum; the laterally extended *hind coxæ* are almost contiguous. The surface is distinctly punctured, punctures several times their own diameter apart, furthest apart on the middle of the metasternum. Each *trochanter* bears a single pale, erect, seta. *Tibiæ* with several short stout spines on the apical margin, these apical spines being on the posterior side of the front ones and the anterior side of the middle and hind pairs. *Front* and *middle tarsi* 5-segmented, *hind tarsi* 4-segmented; the penultimate segment small, short, and narrow in all the tarsi: in the front and middle pairs the basal segment is nearly as long as 2 and 3 together, in the hind tarsi it appears longer than 2 and 3 together: the terminal segment in all the tarsi is nearly as long as the preceding segments taken together.

Loc. Seychelles. Mahé: Cascade Estate, about 800 feet or over, x. 1908—i. 1909.

This insect has at first sight a superficial resemblance to the European Colydiid *Teredus cylindricus*, Ol. (=*nitidus*, Fabr.), but differs from it in having a 3-segmented (not 2-segmented) antennal club and a broader, more truncate head, in the heteromerous tarsi, and in other points. As mentioned above, it also has points of similarity with *Aulonium*, in the form of the sterna and antennæ. But despite its resemblances to this genus of Colydiidæ, it is here placed in Cucujidæ, owing to the structure of the tarsi. Possibly it falls somewhere near the Cucujid genera *Læmotmetus* (=*Asana*) or *Shoguna*. Herr Gebien returned it as having no place in Tenebrionidæ.

Lathridiidæ.

No representatives of this family have to my knowledge been previously recorded from the Seychelles or other islands under review. The collection includes 4 species, belonging to as many genera. Two of them are very widely distributed forms. The remaining two necessitate the erection of two new genera *Nesolathrus* and *Ostomopsis*. I have seen a second species (at present unnamed) of *Nesolathrus* from the West Indies. *Ostomopsis* is so far known only from the Seychelles.

Enicmus, Thomson.

30. *Enicmus minutus* (Linn.).

Enicmus minutus, Reitter, Fauna Germanica, Käfer, iii. 1911, p. 82.
Enicmus (subg. *Conithassa*) *minutus*, Belon, Rev. d'Ent. Caen, 1897, p. 131; Gen. Ins., Fascic. 3, 1902, p. 22.
Lathridius (subg. *Conithassa*) *minutus*, Ganglbauer, Käf. Mitteleur. iii. pp. 779, 783.

One example of this cosmopolitan species was taken in Silhouette (Seychelles), viii. 1908.

Metophthalmus, Wollaston.

The following species is determined as *Metophthalmus albofasciatus*, Reitter (1891), from Reitter's description. I have been unable to verify this determination by comparison with the type or other examples named by Reitter, having failed to find where any such

examples now are*. But I have no doubt as to the identification, for the specimens agree absolutely with the description, and the species is quite distinct from any other *Metophthalmus* in several structural points and in the nature of the pattern formed on it by the white fungoid substance. It was described from Japan, and subsequently recorded as imported into Germany: it is here recorded from the Seychelles and from Java.

In 1908 Reitter separated *M. albofasciatus* from the other species of *Metophthalmus*, making it the type of a new subgenus *Euchionellus*, on the ground of its having large, prominent, laterally-placed eyes, a transverse cordiform prothorax with no grooves for reception of the antennæ beneath, etc. He did not, however, notice that it has elongate, curved trochanters, with the femora articulated on their ends (Plate **20**, fig. 16 *a*), as in the genus *Eufallia* (= *Belonia*†), with which it further agrees in having the head elongated and dilated in front, antennæ inserted some distance in front of the eyes, prothorax transversely furrowed before the base, scutellum indistinct, and prothoracic epimera meeting in the middle line behind the intercoxal process of the prosternum. On the other hand it differs entirely from the only known species of *Eufallia*, the American *E. unicostata* (Belon), in general form, in having 10-segmented instead of 11-segmented antennæ, in the large eyes, transverse, cordate prothorax with explanate margins, and in the presence of three costæ on the disc of each elytron; moreover, *Eufallia* has the front coxæ further apart and the intercoxal process broader, the mesosternum quite differently formed, and the hind coxæ very wide apart and scarcely transverse. In general facies *Euchionellus*, especially when the white coating is not cleaned off, strongly recalls other species of *Metophthalmus*, and it seems best to retain it as a subgenus of *Metophthalmus*, though certain additions require to be made to the definition of it, as follows:

Subgenus Euchionellus, Reitter, *Deutsche Ent. Zeitschr.* 1908, p. 133.

Head elongate, dilated in front. *Eyes* large, prominent, laterally-placed. *Antennæ* 10-segmented, inserted some distance in front of the eyes. *Prothorax* transverse, cordate, explanate at the sides, with a deep transverse furrow before the base, bituberculate in the middle both in front and behind, without any grooves for the reception of the antennæ beneath. *Scutellum* indistinct. *Elytra* each with three longitudinal costæ on the disc, and with each of the intervals furnished with two series of punctures, with lateral margins irregularly expanded, serrate or tuberculate, in front. *Prosternum* forming a very narrow process between the coxæ, which are thus almost contiguous: their cavities closed behind by the prothoracic epimera, which meet in the middle line. *Middle coxæ* globular, separated by a space nearly equal to the width of one of themselves, and having a depression between them, where the meso- and metasternum meet. *Metasternum* (Plate **20**, fig. 16 *a*) convex, with a deep transverse furrow almost immediately behind the middle coxæ. *Hind coxæ*

* Reitter's Lathridiidæ, or a large part of them at any rate, were bought by Grouvelle, and are now in the Paris Museum, where I saw a series of species of *Metophthalmus* ex coll. Reitter. This species however was (Sept. 1920) marked only by a gap and by a label in Grouvelle's handwriting stating that it was missing. My enquiries have elicited the information that it is not in those parts of Reitter's collection which are now in the Museums of Vienna and Budapest. It might possibly be in Belon's collection, now in the hands of Mons. Pic.

† *Eufallia* is given as a new name for *Belonia*, Fall, by Muttkowski, *Bull. Wisconsin Nat. Hist. Soc.* 8. 1910, p. 161.

transverse, extending to the sides of the metasternum, widely separated, with a very deep depression between them. Visible *ventral abdominal segments* 6; the first shorter than the metasternum; segments 1—4 convex, the sutures between them situated in deep furrows. *Legs* slender: *trochanters* (as in *Eufallia*) elongate, curved, with the femora articulated on their ends: *tarsi* 3-segmented, segment 3 a very little longer than 1 and 2 taken together.

31. *Metophthalmus* (*Euchionellus*) *albofasciatus*, Reitter.

(Plate **20**, figs. 16, 16 *a*, 16 *b*.)

Metophthalmus albofasciatus, Reitter, Deutsche Ent. Zeitschr. 1891, p. 23.
Metophthalmus (*Euchionellus*) *albofasciatus*, Reitter, Deutsche Ent. Zeitschr. 1908, p. 133; Fauna Germanica, Käfer, iii. 1911, p. 85.

Length about 1·1 mm. Elongate-ovate, most of the head, prothorax, and underside, and parts of the elytra, covered with a chalky white substance, the arrangement of which is described below. Otherwise the colour is entirely dull reddish brown, with appendages lighter. The following details, and Plate **20**, fig. 16, are drawn from one of the Seychelles specimens with the white substance entirely cleaned off. *Head* elongate, strongly deflexed in front, considerably narrowed in front of the eyes, widening again towards the point of insertion of the antennæ, in front of which the epistome reaches a width equalling that of the vertex between the eyes; labrum narrower than epistome, arcuate in front; side margins of the front, between eyes and antennæ, elevated, carinate; there are also two less marked longitudinal elevations, nearer the middle line, running from about the level of the back of the eyes nearly to the level of the bases of the antennæ; sides of the head behind the eyes convergent, only as long as, or even slightly shorter than, the length of the eyes from back to front; surface of the head appearing minutely rugulose under a high power. *Antennæ* (Plate **20**, fig. 16 *b*) with segments 1 and 2 stout, subglobular, 3 short, shaped like a truncated cone, 4—8 longer, obconic, 9 and 10 dilated to form a club. *Prothorax* with margins minutely tuberculate and each tubercle bearing a short, minute hair, hind angles nearly right angles; with a deep transverse depression before the base, and three elevated portions near the mid-longitudinal line, viz. a pair of raised tubercles, close together, behind the transverse depression, a shortly transverse elevation immediately in front of it, and in front of this again a pair of raised tubercles, wider apart than the posterior pair: surface impunctate, very minutely rugulose under a high power. *Elytra* broader at the base than the greatest breadth of the prothorax, reaching their greatest width before the middle, not soldered along the suture: sutural margin raised, and each elytron with three raised longitudinal costæ between this and the lateral margin, the inner and outer of the three reaching nearer the apex of the elytron than the middle one: the five intervals, separating the costæ and margins respectively, each contain two longitudinal series of large punctures, those of each two series placed not on a level with one another, but alternating: the costæ are slightly depressed at or before the middle of their length, as is clearly seen in profile: the lateral margin is irregularly serrate or tuberculate from the shoulder to about $\frac{1}{3}$ of the length; it has two or three serrations at the shoulder, behind which it is feebly sinuate and bears about three minute serrations widely spaced, behind which it forms a bluntly angular projection. *Hind wings* fully developed, longer

than the elytra. *Prosternum* with a median longitudinal elevation in front of the coxæ. *Metasternum* and *ventral abdominal segments* impunctate, glabrous.

The *white fungoid substance* usually forms a definite pattern on the upper surface: it covers most of the head except the eyes and elevated ridges, and the prothorax except the lateral margins and raised tubercles; on the elytra it fills most of the interval between the lateral margin and outermost costa for the greater part of its length, and at about the middle of the length of the elytron it forms a transverse fascia extending inwards to the innermost costa; it also forms a small fleck on either side of the suture at about $\frac{3}{4}$ of the length from the base. Fainter traces are present on other parts of the elytra. I have not investigated the nature of this substance, but Belon (*Gen. Ins.*, fascic. 3, 1902) refers to it as "enduit cryptogamique." It is very characteristic of other species of *Metophthalmus*, arranged in various patterns, but none of them quite like that of *M. albofasciatus*, and it occurs also in *Eufallia* (= *Belonia*) and possibly in other genera.

Loc. Seychelles: Silhouette, Mahé. Silhouette: 17 specimens were beaten from the thatch, made of leaves of native palms, of the hut where I camped at Mare aux Cochons, over 1000 feet, ix. 1908; the leaves had not been cut for making the thatch more than a few weeks; two other examples from near Mare aux Cochons, method of capture not recorded. Mahé: two specimens, one from near Morne Blanc, the other from Cascade Estate, both circa 1000 feet.

Java: 4 specimens in Brit. Mus., ex coll. Bowring.

Japan: teste Reitter's original description.

Europe: Dresden and Hamburg, imported, teste Reitter.

Nesolathrus, gen. nov.

Elongatus, angustus, lateribus subparallelis, fere glaber, supra dense fortiter (in elytris subseriatim) punctatus. Caput æque latum ac prothorax, antice obtuse acuminatum, suturâ impressâ inter epistoma et frontem. Oculi modice magni. Antennæ ante oculos sub margine laterali capitis insertæ, 11-segmentatæ, clavâ 3-segmentatâ. Prothorax parum transversus, postice parum angustatus, lateribus minute serratis, dente obtuso utrinque in angulo postico, disco haud carinato. Scutellum latum, brevissimum. Elytra abdomen omnino obtegentia, haud striata vel costata, marginibus lateralibus tenuiter reflexis. Coxæ anticæ mediæque fere contiguæ, globulares. Acetabulæ coxarum anticarum postice late apertæ. Coxæ postice late transversæ, anguste separatæ. Segmenta ventralia 5, primo æquilongo ac 2° et 3° simul sumptis. Pedes curti, tarsi omnes 3-segmentati.

Form long, narrow, nearly parallel-sided, rather flattened; the entire upper surface closely and strongly punctured, the punctures on the elytra showing a subseriate arrangement; almost glabrous, bearing only extremely short hairs only visible under a high power. *Head* as broad as the prothorax, produced to a rounded apex in front, the epistome separated by a clearly marked, impressed, slightly arcuate suture. *Eyes* moderately large, rather coarsely facetted. *Antennæ* (Plate **19**, fig. 10 *c*) inserted in front of the eyes, under the side margins of the front: short, 11-segmented, with 3-segmented club; segments 1 and 2 dilated; 3—8 small, equal, transverse; 9 and 10 transverse, 11 truncated distally.

Mouth-parts not studied in detail, the *maxillary palpi* have the terminal segment dilated and acuminate. *Prothorax* a little broader than long, transversely convex, slightly wider in front, with front angles deflexed, not visible from above, nearly right angles: without ridges or depressions on the disc, but with side-margins definite and minutely serrated, and bearing a larger, blunt tooth at the hind angle. *Scutellum* very short and broad. *Elytra* broader at the base than the prothorax, with shoulders rounded; slightly broadening in the middle part, completely covering the abdomen, and the two together forming a single bluntly rounded apex; without striæ or costæ, but closely and subseriately punctured, with punctures larger than those on the head and prothorax; with fine reflexed lateral margins running from the shoulder to more than $\frac{3}{4}$ the length, concealed from above at a point a little behind the shoulder by a slight dilatation of the dorso-lateral part of the elytron; epipleuræ narrow, ending before the apex: *Hind wings* fully developed. *Prosternum* in front of the coxæ about twice the length of the coxæ, convex, almost impunctate, with a rather vague depression on either side running obliquely from the coxa to the front angle, the surface in the region of this depression wrinkled. *Front coxæ* almost globular, nearly contiguous, separated only by a narrow process, reaching behind the coxæ and subtruncate at the extremity: coxal cavities open behind. *Mesosternum* (Plate **19**, fig. 10 *a*) convex, punctured. *Middle coxæ* subglobular, almost contiguous. *Metasternum* punctured at the sides, with an angular slit in the middle of the hind margin, and a depression in front of this. *Hind coxæ* only narrowly separated, extended transversely to the side margins of the metasternum. Visible *ventral abdominal segments* 5, the first equal in length to the two following together. *Legs* short: front, middle and hind *tarsi* have all been mounted in balsam and examined under a high power; all are 3-segmented, the terminal segment longer than segments 1 and 2 together (Plate **19**, fig. 10 *b*). No *external sexual characters* have been detected.

Type of the genus, *Nesolathrus typicus*, sp. n.

The systematic position of this minute insect seems uncertain. The specimens were sent to the late Mons. A. Grouvelle among the Colydiidæ, etc., but were returned by him marked "pas de mes groupes." The 3-segmented tarsi would indicate a relationship with Lathridiidæ, but several genera formerly included in that family are now, despite their 3-segmented tarsi, regarded as Colydiidæ (see Belon, Lathridiidæ, *Gen. Ins.*, fascic. 3, 1902, p. 1, footnote). From described genera of Lathridiidæ and Colydiidæ which seem to be near it, *Nesolathrus* is separated in each case by one or more of the following characters; the close approximation of the coxæ, the 11-segmented antennæ with 3-segmented club, the presence of eyes, and the absence of ridges on prothorax and elytra. *Derolathrus*, Sharp (*Fauna Hawaiiensis*, iii. p. 430, Plate XVI. figs. 8—11), has 10-segmented antennæ with 1-segmented club, hind coxæ more widely distant, tarsi probably 4-segmented. *Holoparamecus* has the club of the antennæ 1- or 2-segmented, middle and hind coxæ much more widely separated. It seems best to place *Nesolathrus* in Lathridiidæ, where it falls into Belon's second tribe, Holoparamecini (*op. cit.*, 1902).

A search through Grouvelle's and other material in the Paris Museum revealed the presence of a second species of the genus, unnamed but quite distinct from *N. typicus*. It is from Guadeloupe, and is mentioned again below, under the specific description of *N. typicus*.

Ochrolissa, Pascoe, has some superficial resemblance to *Nesolathrus*, but is structurally quite different. In an unnamed specimen of *Ochrolissa* from Sumatra, which I have before me, there is no visible line of demarcation between the epistome and the posterior parts of the head: the scutellum is narrower: the tarsi 4-segmented: the coxæ of the front and middle pairs of legs are not quite so close, being separated by nearly the width of one of themselves.

32. *Nesolathrus typicus*, sp. n.

(Plate **19**, figs. 10 *a—c.*)

Niger, politus; scutello epistomateque obscure rufescentibus, antennis rufo-testaceis; tarsis, apice et basi tibiarum pallide testaceis, parte mediâ tibiarum et femoribus nigrescentibus. Long. corp. circa 1·1 mm.

With the characters of the genus. Body uniform black and shining above and below: only the scutellum and front of the epistome are obscurely reddish. Antennæ reddish-testaceous: palps yellow. Legs with the tarsus, apex of tibia, and parts about the femoro-tibial joint, pale testaceous; middle of tibia and femur blackish; coxæ reddish.

6 examples.

Loc. Seychelles. Mahé, Silhouette, Praslin. Mahé: from scrubby endemic forest vegetation at summit of Mount Sebert, nearly 2000 feet, i. 1909, one specimen. Silhouette: near Mont Pot-à-eau, about 1500 feet, viii. 1908, two examples; near Mare aux Cochons, over 1000 feet, ix. 1908, two examples. Praslin: Côtes d'Or Estate, xi. 1908, one specimen.

The unnamed second species of the genus, mentioned above, is represented by several specimens in the Paris Museum from Guadeloupe (Trois Rivières, Dufau, ex coll. Grouvelle). They agree closely in all generic characters with *N. typicus*, but are quite distinct specifically. They are about the same size as *N. typicus*, paler, reddish-testaceous, smooth and shining, very much more sparsely punctured: broader in proportion, especially the prothorax, which is more rounded at the sides.

Ostomopsis, gen. nov.

Corpus depressum, lateribus prothoracis elytrorumque valde explanatis et subtiliter crenulatis. Epistoma postice lineâ impressâ, parum arcuatâ, definitum. Oculi sat magni, laterales, ex facettis multis compositi. Antennæ 10-segmentatæ, segmentis 4—9 curtis, transversis, clavâ magnâ, unisegmentatâ. Prothorax transversus, antice et postice (antice magis) angustatus, lateribus arcuatis, lineâ subbasali, tenui, impressâ, punctatâ, munitus. Scutellum latum, breve. Elytra lateribus fere parallelis, fortiter ac regulariter seriatim punctata, interstitiis haud elevatis, subtilissime punctulatis et pilis sat longis, erectis, instructis. Prosternum processum sat latum, apice dilatatum, inter coxas formans. Coxæ antice globulares, acetabulis postice apertis. Coxæ mediæ magis quam anticæ inter se distantes, transverse oblique sat elongatæ. Coxæ posticæ inter se late distantes. Segmenta abdominalia ventralia 5. Pedes sat curti, trochanteribus brevibus apice oblique truncatis, tarsis omnibus 3-segmentatis, segmento 3° elongato.

Form sub-oblong, flattened, the outline broken by the slight narrowing of the prothorax at its base, the side margins of the prothorax and elytra strongly explanate and crenulate. *Head* deflexed and considerably narrowed in front of the eyes; epistome rounded in front, bounded behind by an impressed and slightly curved line. *Eyes* moderately large and prominent, black, many-facetted, lateral, visible in both dorsal and ventral view, not bounded laterally by a margin of chitin, but themselves forming the outline of the head in that region. *Antennæ* (text-fig. 6 *a*) 10-segmented inserted just in front of, and a little nearer the middle line than, the eyes; segment 3 is about 1½ times as long as broad, and has about 4 obliquely transverse, very fine, raised ridges at the base, giving the impression of the thread of a screw, though I doubt if the arrangement is verticillate, and the three distal ridges do not appear to form complete rings round the segment (cf. *Propalticus*, p. 254): segments 4—9 are all broader than long, segment 9 being much wider than the rest: segment 10 forms a large 1-segmented club, showing (in the balsam-preparation before me) a slight indication in its outline of being formed of two segments fused, though this cannot be traced in surface view, nor is it visible in the other antenna, which is not mounted in balsam, but is viewed as an opaque object. *Prothorax* strongly transverse, narrowed both in front and behind, but more so in front, reaching its greatest width a little behind the middle, its sides arcuate, hind and front angles obtuse; a fine, impressed and punctured line immediately before the base; disc very finely and closely punctured. *Scutellum* very short and broad (cf. *Nesolathrus*, n. g.). *Elytra* a trifle broader at the base than the greatest width of the prothorax, almost parallel-sided, forming together a single obtuse apex and completely covering the abdomen behind, without subsutural or other striæ, each with 8—10 series of large punctures; the interstices are not raised into longitudinal ridges, but are smooth and shining, and bear exceedingly fine punctures from which arise the rather long, erect, pale hairs. *Hind wings* not examined. *Prosternum* (Plate **19**, fig. 11 *a*) forming between the front coxæ a process about equal in width to one of the latter, broadening behind; *front coxæ* globular, their cavities not closed behind by the prosternum. *Mesosternum* drawn in Plate **19**, fig. 11 *a*, detached from the prothorax; the fine median longitudinal keel in its front part would probably be concealed normally by the prosternum: *middle coxæ* more widely separated than the front pair, somewhat elongated in an obliquely transverse direction: the *meso-sterno-metasternal suture* forms a well-marked, shallowly arcuate line, with a depression immediately behind it, nearly level with the hind extremities of the middle coxæ. *Hind coxæ* widely separated, elongated transversely to the side edges of the metasternum; the metasternum has a marked impression in the middle behind, and a not very sharply-defined, oblique ridge on either side in front of the hind femur. Visible

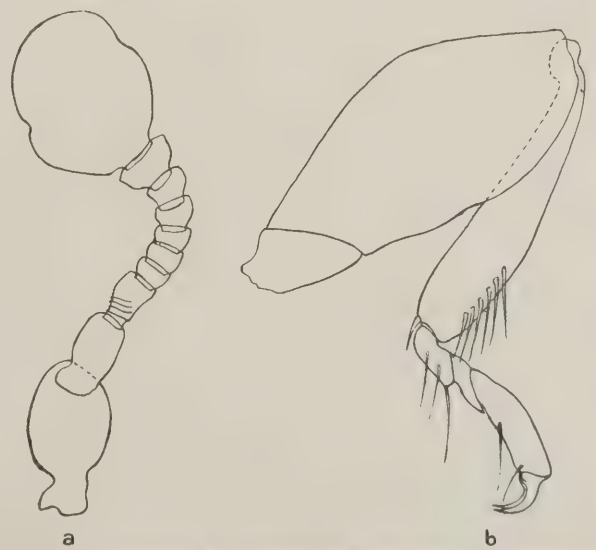


Fig. 6. *Ostomopsis solitaria*: *a*, antenna; *b*, middle leg. Both from balsam-preparations, × circa 233.

ventral abdominal segments 5, the basal one about equal in length to the two following together. *Legs* (text-fig. 6 *b*) rather short: trochanters short, obliquely truncate at the apex: femora flanged beneath at the apex, so that the tibiæ can be received behind these flanges: *tarsi* of the front, middle and hind legs, mounted in balsam and examined under a high power, are seen to be 3-segmented, segment 2 shorter than the basal segment, segment 3 longer than 1 and 2 taken together.

Type of the genus: *Ostomopsis solitaria*, sp. n.

This insect was submitted to the late Monsieur Antoine Grouvelle together with the Colydiidæ, Ostomidæ (Trogositidæ) and other Clavicorn families, but was returned by him with the label "pas de mes groupes." Its flattened form and explanate margins recall the appearance of various Ostomids, though I know of none so minute. In the structure of its antennæ, tarsi, sterna, etc., it is however entirely distinct from these insects, and appears to fall into the family Lathridiidæ and group Holoparamecini (Belon, *Gen. Ins.*, fascic. 3, 1902). In the subgenus *Blumenus* of *Holoparamecus* the antennæ have 10 segments and a 1-segmented club, as in *Ostomopsis*. The form of the sterna, coxæ, etc., also resembles that of *Holoparamecus* in some respects, though the prosternal process of *Ostomopsis* is broader, and its middle coxæ are obliquely extended transversely. *Ostomopsis* differs also widely from *Holoparamecus* in its general form and in the shape of its prothorax, which is not in the least cordiform. From the Merophysiinæ *Ostomopsis* is separated by its 10-segmented antennæ and many other points: altogether it seems isolated and not easy to place. The shape of its scutellum strongly recalls that of *Nesolathrus*; but the latter genus is completely different in general form and in the structure of its antennæ and the closeness of its coxæ*.

33. *Ostomopsis solitaria*, sp. n.

(Plate **19**, figs. 11, 11 *a*: text-fig. 6.)

Brunneo-testacea, modice nitida; capite prothoraceque dense subtiliter punctulatis, breviter pallide pilosis; elytris ut supra descriptis; corpore subtus dense haud profunde punctato. Long. corp. 1·2 mm.

Uniformly brownish-testaceous, only the translucent explanate margins appear a little paler. Clubs of the antennæ not black. Surface shining, the fine punctuation of head and prothorax is very dense, the punctures frequently less than their own diameter apart. Both head and prothorax bear short, pale hairs. On the elytra the large punctures of the

* Since writing the above I have submitted sketches (not the specimen) to Monsieur Lesne, who suggests that *Ostomopsis* might be a form allied to *Tarphius* but with a segment less in the tarsi. On comparing it, however, with several species of *Tarphius* ex coll. T. V. Wollaston, other differences are apparent. The antennæ of *Ostomopsis* have also a segment less, due to the fusion of the last two segments into a single club-segment. *Tarphius* has a quite different scutellum, triangular and practically hidden when the bases of prothorax and elytra are closely applied. The outline of *Ostomopsis* to some extent recalls *Tarphius*, but *Ostomopsis* is much more flattened; its surface is quite different, lacking the elevations and depressions; smooth and shiny, not granulate or tuberculate as in *Tarphius*, but merely punctate: the hairs also are finer and of a less rigid type. On examining the underside of *Tarphius simplex*, Woll., I find its front coxæ much wider apart, and as far distant from one another as those of the middle pair, while in *Ostomopsis* those of the front pair are nearer together. The middle and hind coxæ of *Tarphius* are not laterally prolonged.

longitudinal series are connected by shallow transverse depressions, giving the surface a slightly rugulose appearance when viewed in certain positions. Not only are the actual margins of the elytra finely crenulate, but there is a series of swellings or scallopings separated by impressions along the line where the explanate marginal portion meets the sloping discal portion. The erect hairs—which, as noted above, arise from minute interstitial punctures, not from the punctures of the longitudinal series—were present all over the elytra, but have unfortunately become seriously denuded in manipulating the insect. The underside is alutaceous, closely covered with rather large, shallow punctures, which are especially strong and close on the mesosternum; ventral abdominal segments shortly pilose.

Loc. Seychelles. Silhouette: near Mont Pot-à-eau, about 1500 feet, viii. 1908, one example; forest above Mare aux Cochons, over 1000 feet, one example.

During transit to and from Monsieur Grouvelle one of the two examples became detached from its card and lost. The description and figures are drawn up from the remaining one—the unique type. The head and prothorax of this unfortunately became detached from the hind parts during the handling necessitated by study of the underside, and fig. 11*a* was made while these parts were separated; they were subsequently placed together again.

Mycetophagidæ.

This family is represented only by a cosmopolitan species, and by a new species of the anomalous genus *Propalticus*, which is provisionally retained within the limits of the group. No Mycetophagid has, to my knowledge, been previously recorded from any of the islands under review.

Typhæa, Curtis.

34. *Typhæa fumata* (Linn.).

Cosmopolitan. 10 examples from the Seychelles (Mahé, Cascade Estate, about 800 feet, 1908) and 2 specimens from Rodrigues (Snell and Thomasset, 1918). Several are rather dark in colour above.

Propalticus, Sharp.

Propalticus, Sharp, *Tr. Ent. Soc. London*, 1879, p. 88; id., *Cistula Ent.*, iii. 1882, p. 31, pl. ii. fig. 1; Scott, *Fauna Hawaiiensis*, iii. p. 420, pl. xvi. figs. 12—14, 1908.

This genus was erected to contain a single species, *P. oculatus*, Sharp (*l.c.*), from the Hawaiian Islands. A second species, *P. jansoni*, was described in 1882, from New Guinea. Additional remarks on the generic characters were published by the present writer in 1908 (*l.c.*). I am not aware that any other species has been described till now, when the characters of a third form, found in the Seychelles, are subjoined below. There are in the Paris Museum a number of undescribed forms of this genus, from Madagascar, Sumatra and the Nias Islands, Japan, Sierra Leone and San Thomé. These closely resemble the Hawaiian and Seychelles forms in all generic characters, and several of them are discussed further below (p. 256).

The Paris Museum also contains some undescribed insects of very extraordinary form from the Cameroons and the Belgian Congo: these appear to belong to the same, or at least to a closely-related, genus. At any rate the wide distribution of *Propalticus* over various points from West Africa to Japan is established.

The systematic position of *Propalticus* is obscure. Dr Sharp referred to it as "most anomalous" and considered that it would be "least ill-placed in Mycetophagidæ," in which family it is provisionally retained. The Hawaiian species and its congener from the Seychelles agree closely in all characters which may be regarded as generic, though they exhibit well-marked points of specific differentiation, as described below. In both forms the *tarsi* are 5-segmented, and the front legs are elongate, with tibiæ somewhat dilated and bearing a large spur of remarkable form, flattened and with serrated edges, at the apex (*Faun. Haw.*, iii., pl. xvi. fig. 14). The Hawaiian species leaps very actively, and Dr Sharp thought that this saltatorial power must have its seat in the front legs. I did not observe whether *P. sechellarum* leaps or not.

The *hind wings* are fully developed in both these species.

Antennæ (text-fig. 7). Although I had examined an antenna of the Hawaiian species mounted in balsam under a high power, yet my interpretation of its structure as published in *Fauna Hawaiiensis* was incorrect. It is not, as there stated, 15- or 14-segmented, but in reality only 11-segmented, though the form of segments 9—11 is so curious that the error may be excusable. What I took to be a very short basal segment is only the constricted knob-like portion, which articulates with the head, at the base of the basal segment. The further error in counting the segments arose from my regarding each of the three club-segments as being two. Segments 9 and 10 have each a swollen basal portion, surrounded at the apex with a raised flange, the surface within which is densely set with fine hairs, while from the extreme outer side of it rises a slender portion, with which the following segment articulates. This slender portion has at first sight the appearance of a separate, narrow segment, but there is no real articulation at its base, and it is simply a continuation of the dilated basal portion. The terminal segment is also divided into two parts by an encircling flange, and the distal part is hollowed out and set with fine hairs on its inner side. Each club-segment bears two whorls of larger setæ, one near its base and one on the flange, and the terminal segment bears a third group at its extreme apex.

In both species the *third segment* has several closely parallel, raised, obliquely transverse ridges at its base. They are only clearly discernible at magnifications of about 210 to 380 diameters or more. Their appearance recalls the thread of a screw, but I have not been able to trace a spiral arrangement, and think they are probably only parallel ridges encircling the segment. It has been suggested to me that they may possibly act as a *stridulating organ* by rubbing against the sides of the cup-like socket at the apex of segment 2, in which segment 3 articulates. In examining the antennæ of various other minute Coleoptera in balsam under a high power I have several times noticed that if ridges or reticulations are present in the chitin they tend to become more marked and closer at the base of the third segment, and to approach somewhat the screw-like arrangement described above, but I do not recall other cases in which it is as regular as in *Propalticus* and *Ostomopsis* (p. 251).

35. *Propalticus sechellarum*, sp. n.

(Text-fig. 7*a*.)

Propaltico oculato similis, sed elytris curtioribus, elytro utroque maculâ magnâ, flavâ, in dimidio postico notato; scutello pallido, flavo; elytrorum striis minus conspicuis, striâ internâ et striâ mediâ utriusque elytri ad basin vix convergentibus, fere parallelis; antennis brevioribus, segmentis intermediis curtis. Long. corp. circa 1·4 mm.

Closely similar to *P. oculatus*, but with the elytra slightly shorter in proportion. The coloration of the elytra is different: in *P. oculatus* each elytron has a reddish spot (marked

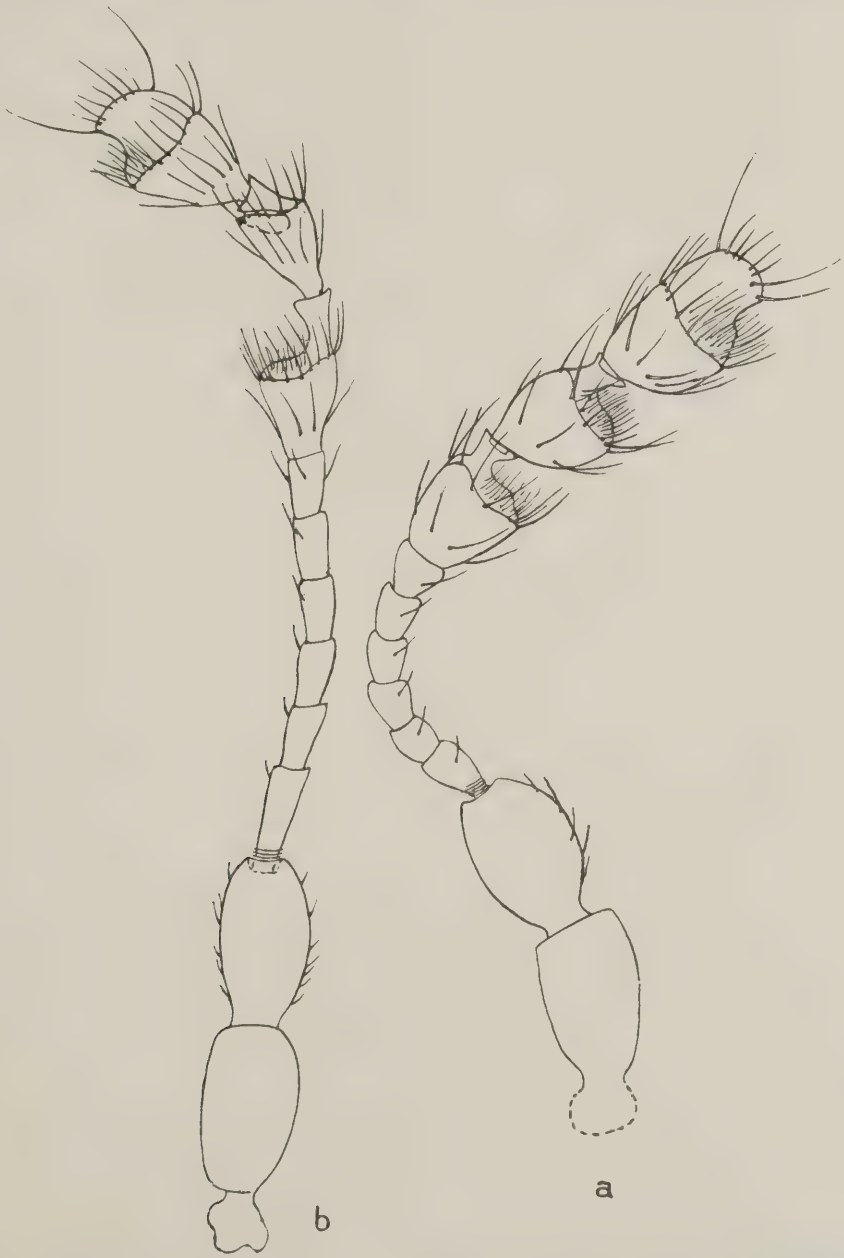


Fig. 7. Antenna of *Propalticus*: *a*, *P. sechellarum*: *b*, *P. oculatus*, Sharp (Hawaiian Islands). Both from balsam-preparations, × circa 233. In the preparation from which *b* is drawn the middle club-segment has collapsed and is bent on itself.

not only by the lighter coloration of the chitin but by the hairs being paler than those on the surrounding parts) near the suture just before the middle of the length, and sometimes a second smaller, fainter, reddish spot near the apex: in *P. sechellarum* each elytron has a large, sharply-marked, pale yellowish area occupying most of the posterior half, extending nearly as far forwards as the middle, and separated from the suture and the apex only by a narrow band of darker coloration. The scutellum in *P. sechellarum* is also light yellowish, not dark as in *P. oculatus*. The three striæ on each elytron are also differently arranged: in *P. oculatus* they are deeper and more clearly marked, the innermost one runs right to the base of the elytron, and it and the middle stria converge appreciably towards the base: in *P. sechellarum* the striæ are more faintly marked, and the inner and middle striæ continue to the base almost parallel.

The differences in the *antennæ* of the two species are best shown by text-fig. 7. The antenna of *P. sechellarum* is shorter; segments 3—8 are much less elongate, this being specially noticeable in segment 3; the produced distal parts of segments 9 and 10 are also shorter. The transverse striæ are present at the base of segment 3 in both species (see above).

7 examples.

Loc. Seychelles. Silhouette, Mahé. Silhouette: on or near Mare aux Cochons plateau, over 1000 feet, viii. 1908, 1 specimen. Mahé: Cascade Estate, several places between 800 and 1500 feet, 6 specimens.

The close comparison given above is between *P. oculatus* and *P. sechellarum*. Since writing it I have examined several of the unnamed forms, mentioned above, in the Paris Museum. Although such details as the exact form of the antennal segments have not been entered into, yet the following notes may be worth placing on record.

(i) A specimen from *Madagascar* (Tananarive, ex coll. Grouvelle) closely resembles *P. sechellarum* in general form. It is rather broad, and larger than any of the examples of *P. sechellarum*: the pale spot in the apical part of the elytron is very much smaller. There are faint traces of an intermediate stria between the subsutural stria and the one next to it, traces which have not been detected in *P. sechellarum* at all. Until a larger material is obtained and studied, it cannot be definitely said whether the Madagascan example belongs to a distinct species, or is a form of *P. sechellarum*.

(ii) Several examples from *San Thomé* (ex coll. Grouvelle) also have a general resemblance to *P. sechellarum*. They have however no pale spots on the elytra at all, but are uniformly dark except for the yellow scutellum, and (in some specimens) two very obscure longitudinal yellowish lines down the middle of the prothorax. The elytral punctuation is just appreciably closer than in *P. sechellarum*, and the subsutural stria is almost obsolete, only faintly discernible.

(iii) A specimen from *Sierra Leone* (ex coll. Grouvelle) is uniformly dark, including the scutellum. The subsutural stria is well marked, extending almost to the base of the elytron.

(iv) Two examples from *Sumatra* (ex coll. Grouvelle) are smaller, and have *two* rather obscure pale spots on each elytron, one near the suture in the basal part, and one near the apex. The subsutural stria is distinct, but disappears in front.

What is the relationship of these and other undescribed forms one to another must be left for further study to decide.

Bostrychidæ.

Seven species of this family are here recorded from the Seychelles and two from Aldabra, all of them being widespread forms. Five species from the Seychelles and the two from Aldabra are contained in the collection of the Percy Sladen Trust Expedition: Kolbe (*Mitt. Zool. Mus. Berlin*, v. 1910, p. 27) enumerates four species as having been obtained by Brauer in the Seychelles, two of these being forms that were also found by myself, while the other two are not represented in the Percy Sladen Trust collection. The following is a list of the Seychelles species, the two that were taken by Brauer but not by myself being indicated by an asterisk: *Dinoderus minutus, Dinoderus ocellaris*, Heterobostrychus æqualis, Heterobostrychus brunneus*, Xylopertha picea, Xylothrips flavipes, Xylopsocus capucinus.* The two Aldabra species are *Sinoxylon conigerum* and *Apate congener.*

I am also able to include records of four species from Rodrigues Island, collected by Messrs H. P. Thomasset and H. J. Snell in 1918. They are: *Dinoderus minutus, Bostrychoplites cornutus, Xylopsocus capucinus, Sinoxylon conigerum.* All except the second are included also in the Seychelles or Aldabra lists.

The whole of these determinations rest on the authority of Monsieur P. Lesne, to whom I submitted all my Seychelles and the Rodrigues material, and who also identified the species found by Brauer. In the following enumeration, citations from *Ann. Soc. ent. France* refer to Mons. Lesne's valuable "Revision" of the family, published in parts in that journal.

36. *Dinoderus minutus*, Fabr.; Lesne, *Ann. Soc. ent. France*, vol. 66, 1897, p. 329.

Five examples from Cascade Estate, Mahé, 800—1000 feet. Seven specimens from Rodrigues. Found throughout the Tropics.

37. *Dinoderus ocellaris*, Steph.; Lesne, *t.c.* p. 331; Kolbe, *l.c.*

Found in Mahé, at Mamelles Plantation, by Brauer. First discovered in a chest of coffee in London.

38. *Heterobostrychus æqualis*, Waterhouse; Lesne, *op. cit.* 67, 1898, p. 560; Kolbe, *l.c.*

Seychelles: one specimen, collected by J. A. de Gaye, exact locality not stated. Widely spread in the Oriental Region, New Guinea, Madagascar, and Comoro Islands.

39. *Heterobostrychus brunneus*, Murray; Lesne, *t.c.* p. 564; Kolbe, *l.c.*

Seychelles: found by Brauer in cultivated places in Mahé. Madagascar, Tropical and South Africa.

40. *Bostrychoplites cornutus*, Olivier; Lesne, *t.c.* p. 572.

Rodrigues: two examples. Tropical and South Africa, Arabia, Madagascar, Mascarene and Comoro Islands.

41. *Xylopertha picea*, Olivier; Lesne, *op. cit.* 69, 1900, p. 529.

Seychelles: eight examples from Mahé and two from Praslin (1905, 1906, 1908—9); the exact locality is only recorded in the case of two specimens, both from Baie Lazare in Mahé, a cultivated district near the sea. Known from the whole of Africa, Cape Verde Islands, the Red Sea coast of Arabia and Palestine; Sardinia and Andalusia, perhaps imported; South America, imported.

42. *Xylothrips flavipes*, Illiger; Lesne, *t.c.* p. 621; Kolbe, *l.c.*

Seychelles: 26 specimens; 21 from Silhouette, four from Praslin (1905), one from Mahé (1906); the Silhouette examples are from near Mont Pot-à-eau and Mare aux Cochons, at elevations considerably over 1000 feet and well within the limits of the native forest. Also found by Brauer in cultivated places in Mahé. Madagascar and the Mascarene Islands; also widely distributed in the Oriental Region and the Malay Archipelago as far East as the Philippines and Moluccas.

43. *Xylopsocus capucinus*, Fabr.; Lesne, *t.c.* p. 631.

Seychelles: 26 specimens, from Silhouette and Mahé; the Silhouette specimens from the same places as those of the preceding species; the Mahé examples are from the country above Port Glaud, 500—1000 feet, and from Cascade Estate, about 1000 feet. Rodrigues: one specimen. Madagascar, Comoro and Mascarene Islands; widely spread in the Oriental Region and the Malay Islands, as far as the Philippines and New Caledonia. It has also been found in West Africa and South America, probably imported.

44. *Sinoxylon conigerum*, Gerstaecker; Lesne, *op. cit.* 75, 1906, p. 504.

Aldabra: two specimens taken by H. P. Thomasset in 1907. Rodrigues: five examples. East Africa, Madagascar, Mascarene Islands, India, Ceylon, Hawaiian Islands.

45. *Apate congener*, Gerstaecker; Lesne, *op. cit.* 78, 1909, p. 525.

Aldabra: six specimens collected by Fryer (1908—9), and one found by A. d'Emmerez (1907). A manuscript record by Fryer states that they appear at night in the huts, and that they probably come out of the wood of *Ceriops*, of which the latter are built*. [In Silhouette (Seychelles), *Platypus lepidus* and one or more species of *Xyleborus* came to the lamp in huts built of freshly-split lathes of the palm *Verschaffeltia*: see *Tr. Linn. Soc.*, xvi. p. 382.] *A. congener* is widely distributed in the Eastern parts of Africa, from the Southern part of British East Africa as far South as the Transvaal; and it occurs in Madagascar and the Mascarene Islands.

Lyctidæ.

46. *Lyctus brunneus*, Steph.

Two examples (determined by P. Lesne) of this almost world-wide insect were found in Mahé; one at Cascade Estate, at about 800 feet, in 1908; the other was taken by Thomasset in 1914. No representative of the family has to my knowledge been recorded previously from the Seychelles.

* *Ceriops* is one of the genera of mangroves found in Aldabra. See Fryer, "Formation of Aldabra and neighbouring islands, with notes on their flora and fauna"; *Tr. Linn. Soc. London*, Ser. 2, Zool., xiv, pp. 414—5 (1911).

EXPLANATION OF PLATES 19—22.

Plate 19.

Fig. 1. *Cephennium felicitas*, sp. nov., × 45, showing the setæ, foveoles, and subhumeral folds; *a*, left-hand middle tibia and tarsus, × 100.
Fig. 2. *Neseuthia cordithorax*, gen. et sp. nov., ♂, × 45.
Fig. 3. *Neseuthia typica*, sp. nov., ♂, × 45; *a*, head of ♂, × 100.
Fig. 4. *Neseuthia minor*, sp. nov., ♂, × 45; *a*, head of ♂, × 100.
Fig. 5. *Neseuthia perexigua*, sp. nov., ♂, × 45; *a*, head of ♂, × 100.
Fig. 6. *Neseuthia polita*, sp. nov., ♂, × 45; *a*, head of ♂, × 170.
Fig. 7. *Neseuthia crenata*, sp. nov., ♀, × 45.
Fig. 8. *Neseuthia cornuta*, sp. nov., ♂, head and prothorax, × 100; *a*, head in profile, slightly tilted, so that both the frontal prominences are visible, × 100. In both figures the head is much pulled out from the prothorax.
Fig. 9. *Scydmænus armatus*, sp. nov., ♂, × 45; *a*, right-hand hind coxa, trochanter, and femur, viewed from behind, × 100.
Fig. 10. *Nesolathrus typicus*, gen. et sp. nov., × 45; *a*, underside, × 66 (head and all parts of the legs except the coxæ not shown); *b*, tibia and tarsus of middle leg, × 350, from a balsam-preparation; *c*, antenna, × 350, from a balsam-preparation.
Fig. 11. *Ostomopsis solitaria*, gen. et sp. nov., × 45 (the hairs are much denuded); *a*, underside, × 66 (this drawing was made when the head and prothorax were detached from the hind body, hence a space is shown between the two parts. All parts of the front and middle legs except the coxæ are left out of the drawing, but the trochanters and femora of the hind legs are shown).

Plate 20.

Fig. 12. *Euconnus seychellensis*, sp. nov., × 45.
Fig. 13. *Scydmænus lodoiceæ*, sp. nov., × 29; *a*, right-hand front femur viewed from in front, slightly tilted, the lower front margin represented by the dotted line, × 100.
Fig. 14. *Stenichnoteras montanum*, gen. et sp. nov., × 29; *a*, head in profile (MDB. = mandible; maxillary palp fully shown, but rest of maxilla and labial palp bent under head and not fully shown), × 66 *b*, outer side of terminal segment of right-hand antenna of the specimen without median prothoracic grooves, showing the vesicles, × 100.
Fig. 15. *Euconnus senex*, sp. nov., × 45; *a*, left-hand side of head from above, showing eye, setæ, and brush of stiff hairs at the hind angle, × 170.
Fig. 16. *Metophthalmus* (*Euchionellus*) *albofasciatus*, Reitter, × 45 (all the white fungoid substance removed, to show the sculpture); *a*, meso- and metasterna (with trochanters and femora of middle and hind legs (these are missing in one of the hind legs), × 66. M.C., middle coxa; TR., trochanter; M.F., middle femur; EPS., meta-episternum; H.C., hind coxa); *b*, antenna, × 295, from a balsam-preparation.
Fig. 17. *Scaphosoma mahense*, sp. nov., × 29.
Fig. 18. *Scaphosoma pictum*, Motschulsky, *forma*, × 29.

Plate 21.

Fig. 19. *Scaphosoma pictum*, Motschulsky, *forma*, antenna, × 100; *a*, segments 3—6 of antenna, × 350; *b*, maxillary palp, × 100: all from preparations in balsam.
Fig. 20. *Scaphosoma silhouettæ*, sp. nov., antenna, × 100 (terminal segment missing); *a*, segments 3—9 of antenna, × 350: both from balsam-preparations.
Fig. 21. *Scaphosoma mahense*, sp. nov., antenna, × 100; *a*, segments 3—6 of antenna, × 350: both from balsam-preparations.

Fig. 22. *Scaphosoma achardianum*, sp. nov., antenna, × 295; *a*, maxillary palp, × 295: both from balsam-preparations.

Fig. 23. *Toxidium seychellense*, sp. nov., × 24; *a*, maxillary palp, × 295; *b*, labium, × 295: *a* and *b* from balsam-preparations.

Fig. 24. Antenna of (*a*) *Toxidium seychellense*, (*b*) *Toxidium praslinense*, × 100, from balsam-preparations.

Fig. 25. Segments 1—5 of antenna of (*a*) *T. seychellense*, (*b*) *T. praslinense*, × 295, from balsam-preparations.

Fig. 26. Segments 7—9 of antenna of (*a*) *T. seychellense*, (*b*) *T. praslinense*, × 295, from balsam-preparations.

Fig. 27. (*a*) *Toxidium seychellense*, (*b*) *T. praslinense*, (*c*) the N. American *T. gammaroides*, Leconte; bodies in profile (in the two former head and prothorax are not shown), × 29: M.C., middle coxa; H.C., hind coxa; EPS., episternum of mesothorax, in *T. gammaroides* separated from the middle coxa by a longitudinal suture; EP., epimeron of metathorax; S., suture separating metasternum (below) from meta-episternum (above), this suture is obsolete at both ends in *T. seychellense*; M.EP., mesothoracic epimeron, visible as a distinct piece in the two Seychelles species but not in *T. gammaroides*.

Plate 22.

Fig. 28. *Nesotoxidium typicum*, gen. et sp. nov., × 24.

Fig. 29. *Nesotoxidium typicum*, ventral view of meso- and metasterna, × 66; epipleuræ of elytra are not shown, and the meso-epimera appear shorter than they actually are owing to the slope: MES., mesosternum; M.C., middle coxa; M.EPS., meso-episternum; M.EP., meso-epimeron; MT.EPS., meta-episternum; MT.EP., meta-epimeron; H.C., hind coxa.

Fig. 30. *Nesotoxidium typicum*: *a*, antenna; *b*, maxillary palp; *c*, labium. All from balsam-preparations, × 295.

Fig. 31. *Scydmœnus seychellensis*, sp. nov., × 45 (the middle tibiæ are a little foreshortened in the figure); *a*, one side of the underside of the body, showing the suture separating metasternum from episternum and the bases of middle and hind legs, × 45.

Fig. 32. *Scydmœnus insularum*, sp. nov., × 45; *a*, one side of the underside of the body, showing absence of suture between metasternum and episternum (middle leg entirely removed, only coxal acetabula visible), × 45; *b*, middle tibia and tarsus of ♂ from inner side, × 100.

Fig. 33. *Stilboides angulicaput*, sp. nov., with head exserted, × 29.

Fig. 34. *Stilboides angulicaput*, ventral view of thorax, × 56. The prothorax is pulled forward so that a space intervenes between the prothoracic intercoxal process and the metasternal process. The femora (M.F.) of the middle pair of legs are pushed forward to give a clear view of the subfemoral lines, and are seen edgeways, which causes them to appear very narrow. The hind coxæ are not shown. F.C., front coxa; M.F., middle femur; M.C., middle coxa; EL., epipleura of elytron (cut off behind); EPS., meta-episternum; S.F.L., subfemoral line.

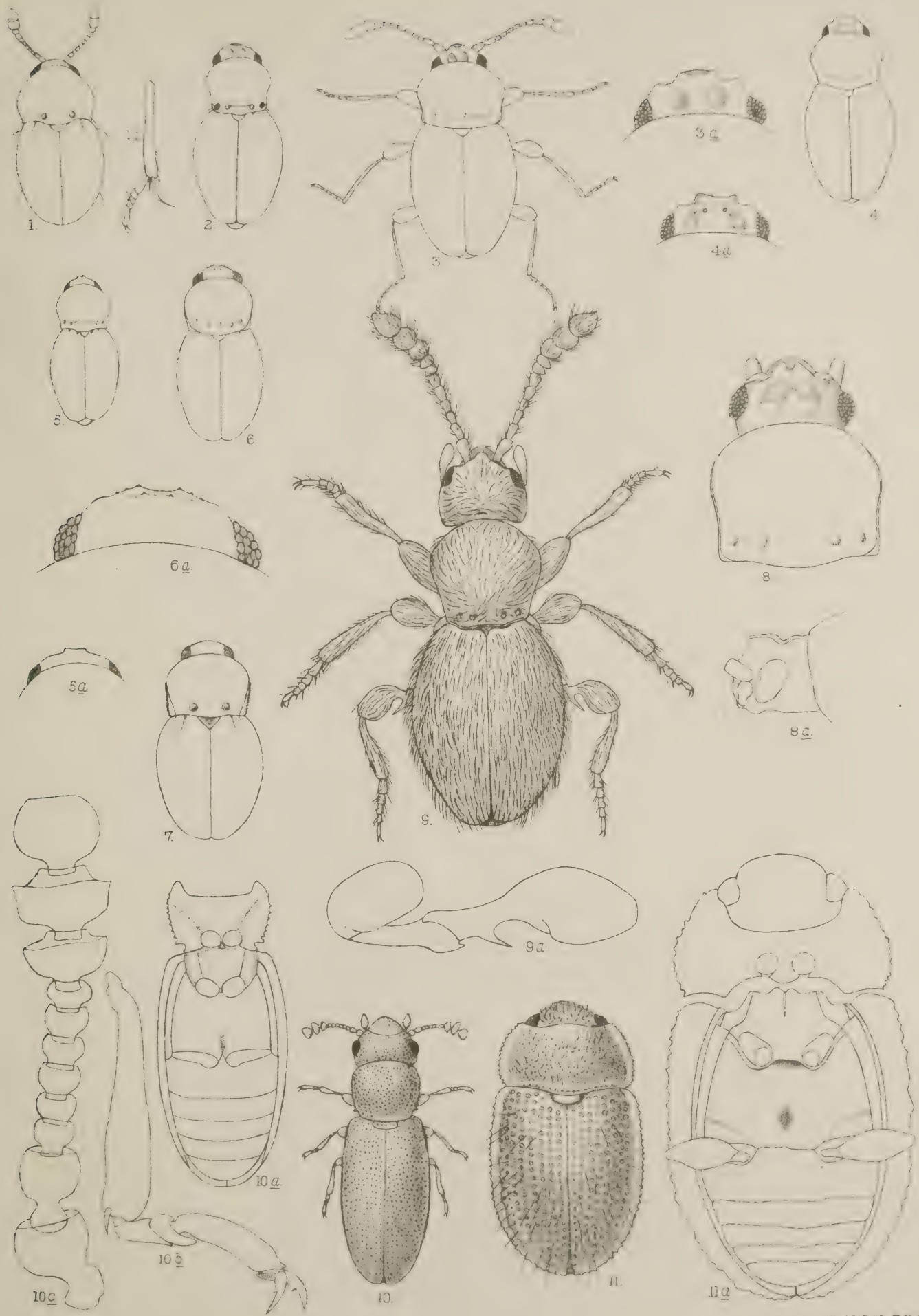
Fig. 35. *Nesiotus similis*, sp. nov., head retracted, × 29.

Fig. 36. *Nesiotus tropicus*, sp. nov., metasternum etc., × 56. The epipleuræ of the elytra and the hind coxæ are not shown. M.L., metasternal lobe with its thickened front margin; M.C., middle coxa; M.F., middle femur; EPS., meta-episternum; S.F.L. subfemoral line.

Fig. 37. *Phalacratomus exiguus*, gen. et sp. nov., with head retracted, × 29.

Fig. 38. *Phalacratomus exiguus*, underside of prothorax, tilted to show the long-oval form of the coxæ, × 66. F.C., coxa of front leg; TR., trochanter; F., femur; I.PR., intercoxal process.

Fig. 39. *Phalacratomus exiguus*, meso- and metasterna, × 66. Epipleuræ of elytra and hind coxæ not shown. MES., mesosternum; M.C., middle coxa; M.F., middle femur; EPS., meta-episternum.



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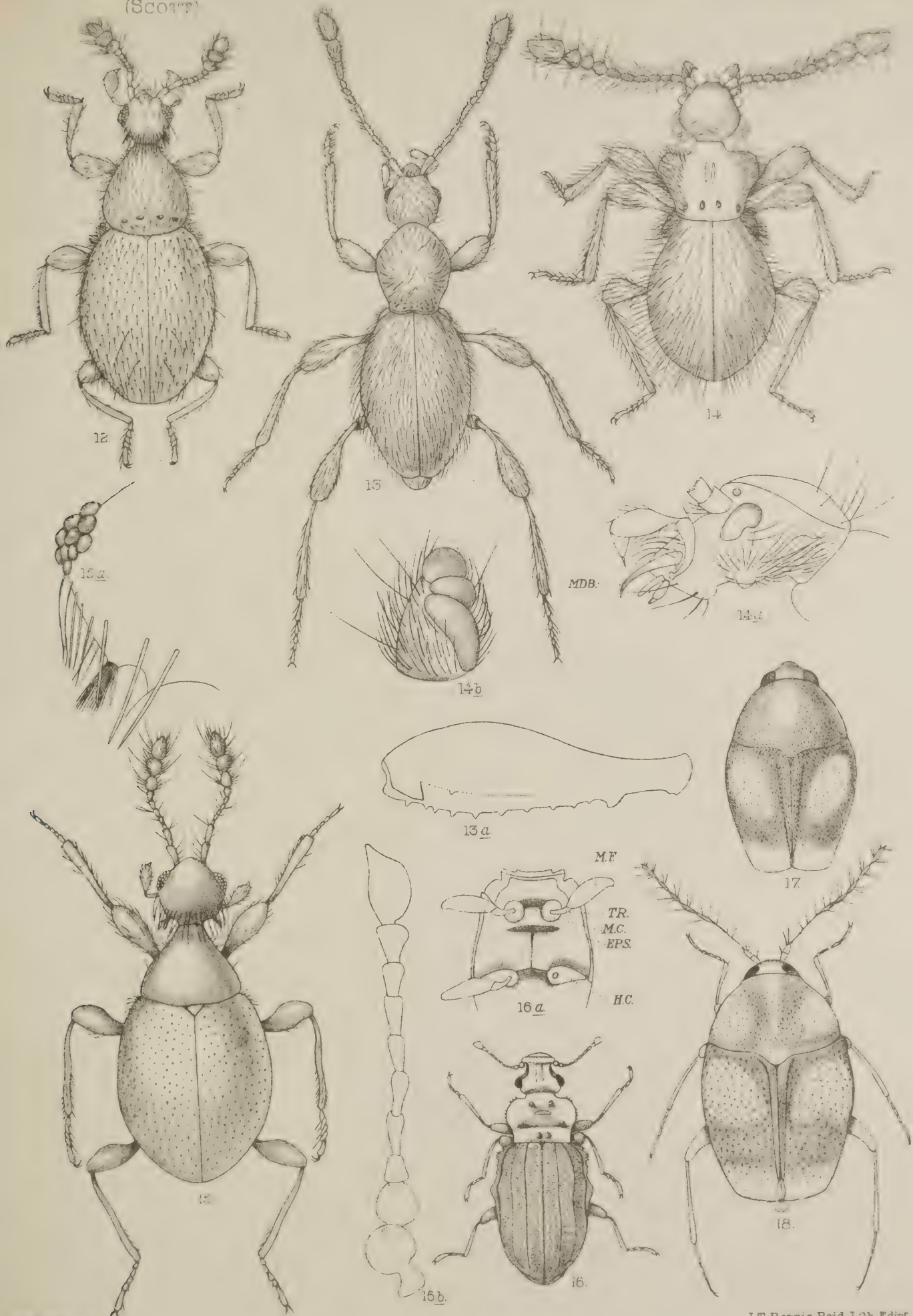
J. T. Rennie Reid, Lith. Edinr.

SCYDMAENIDÆ AND LATHRIDIIDÆ FROM THE SEYCHELLES.



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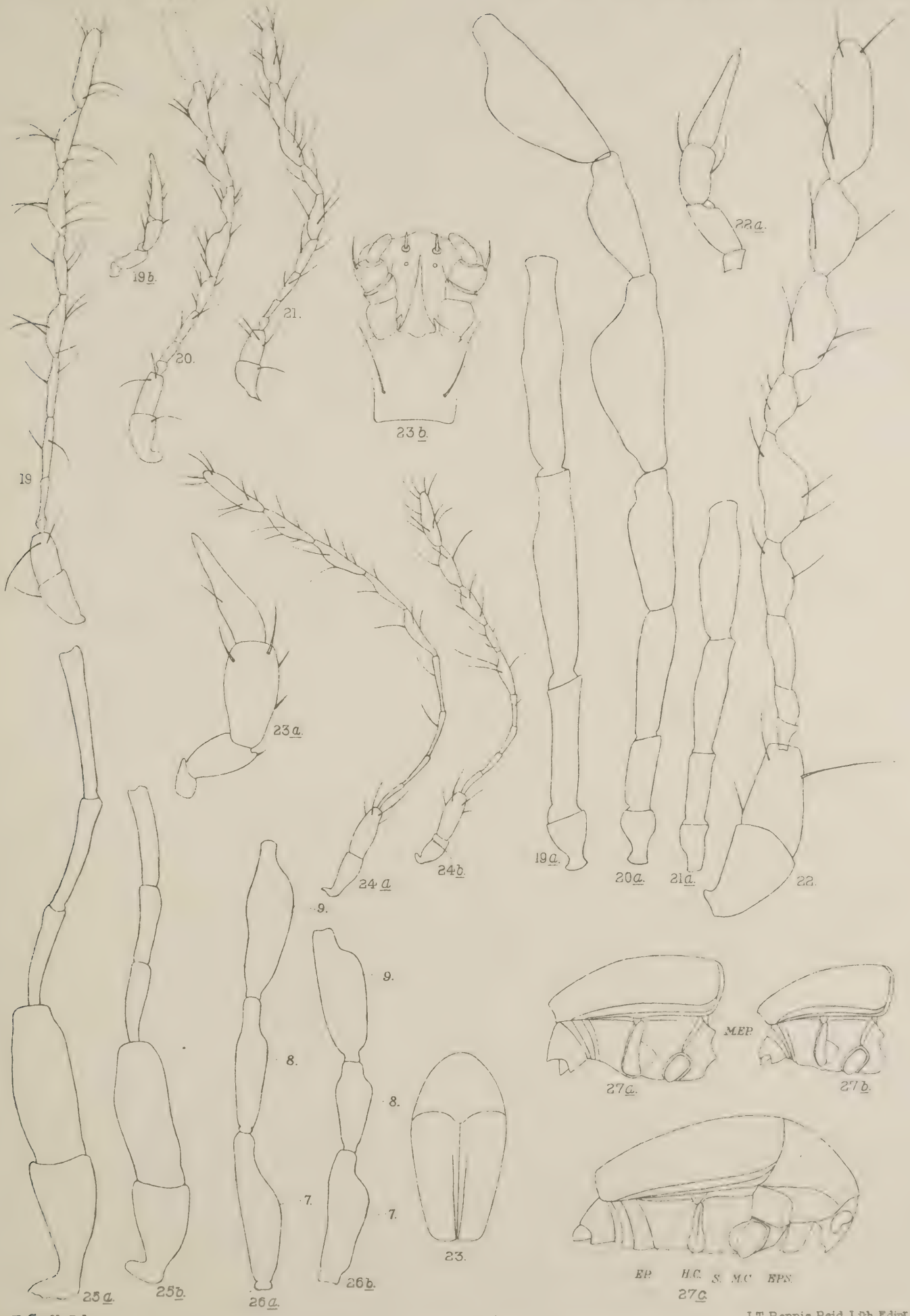
J. T. Rennie Reid, Lith. Edinr.

SCYDMAENIDÆ, SCAPHIDIIDÆ, AND LATHRIDIIDÆ FROM THE SEYCHELLES



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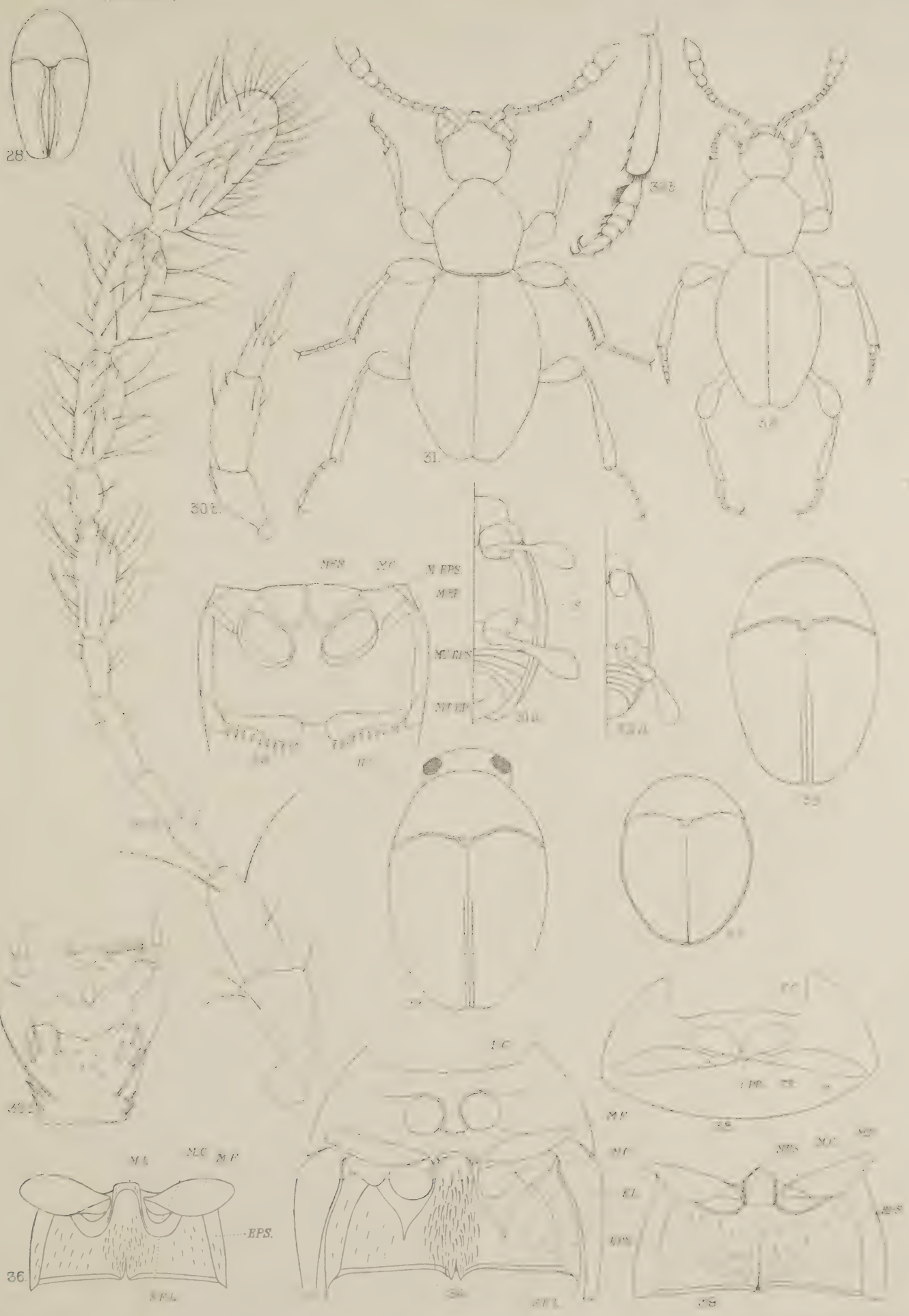
SCAPHIDIIDÆ FROM THE SEYCHELLES.



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SCYDMAENIDÆ, SCAPHIDIIDÆ AND PHALACRIDÆ FROM THE SEYCHELLES.

No. V.—COLEOPTERA, HETEROMERA: TENEBRIONIDAE.

Von Hans Gebien (Hamburg).

(Mitgeteilt von Prof. J. Stanley Gardiner, M.A., F.R.S., F.L.S.)

(Tafel **23** und 22 Textfiguren.)

Gelesen den 5. Mai, 1921.

EINLEITUNG, ZOOGEOGRAPHISCHES.

Wenn wir von Kolbes Arbeit: "Die Coleopterenfauna der Seychellen" (Mitt. Zoolog. Mus. Berlin v. 1. Heft, 1910, pp. 1—49) absehen, ist nichts Zusammenfassendes über die Tenebrioniden unserer Inselgruppe veröffentlicht worden. Nur Fairmaire hat in verschiedenen Arbeiten einzelne Arten, die auf den Seychellen Heimatrecht haben, neu beschrieben, nämlich:

1. Ann. Soc. Ent. Fr. (4) viii. 1868, p. 799: *Uloma crenatostriata.*
2. Bull. Soc. Ent. Fr. 1893, p. cccxxiv: *Gonocephalum micantipenne.*
3. Ann. Soc. Ent. Belg. xxxix. 1895, p. 445: *Phaleria attenuata.*

Von diesen Arten ist nur die erste auf den Seychellen endemisch, die andern beiden sind weiter verbreitet.

Die Fauna der Seychellen und benachbarten Inselgruppen darf ein besonderes Interesse beanspruchen. Einmal gestattet die Fauna einer isolierten, altertümlichen Inselgruppe an und für sich wichtige Schlüsse in tiergeographischer und systematischer Beziehung. Ferner aber sind die Seychellen insbesondere wegen der zahlreichen Beziehungen, die sich zwischen ihnen und der indischen Fauna einerseits und der madegassischen und afrikanischen Fauna andererseits finden, der Gegenstand aufmerksamer Forschung gewesen. Und gerade in neuerer Zeit sind die Inseln durch Sammler gründlich erforscht worden. Wahrscheinlich ist nicht mehr viel Neues zu erwarten, und das Bild, des wir uns von der Fauna der Inseln machen können, dürfte wohl in kleinen Zügen Änderungen erfahren, aber nicht mehr grundlegend verändert werden.

Für die nachfolgenden Untersuchungen lag mir ein ausserordentlich reiches Material vor und zwar 1. das gesamte von der Seychellen-Expedition gesammelte, das mir von Herrn Dr Hugh Scott zur Bearbeitung anvertraut wurde und 2. das sehr wertvolle des Berliner Museums, meist gesammelt von Prof. Brauer und später von Merian.

Ich hielt es aber auch für dringend erforderlich, die sehr reiche Ausbeute, die Voeltzkow auf den Aldabra-Inseln und den Comoren machte, zum Vergleich heranzuziehen; sie wird ebenfalls im Berliner Museum aufbewahrt. Ich habe Herrn Dr Kuntzen für die liebenswürdige Hülfe, die er meinen Arbeiten gewährte, auch an dieser Stelle zu danken.

Epiphaleria pallida, die Fairmaire noch einmal unter dem Namen *Phaleria attenuata* beschrieben hat. Kolbe führt sie unter den afrikanischen Elementen der Fauna auf. Die andere ist *Uloma scita* Walk. (nec Fairm.). Aber auch die Gattung *Diphyrrhynchus* dürfte als östliche Form anzusprechen sein, sie ist am formenreichsten im papuanischen und australischen Gebiet, die letzten Ausläufer finden sich an der afrikanischen Östküste (siehe den systematischen Teil).

4. *Madegassische Elemente.* Es sind auf den Seychellen einige Arten vorhanden, von denen man annehmen kann, dass Madagaskar das Zentrum ihrer Verbreitung ist. Von dort haben sich die Arten über unsere Inselgruppen, die Comoren und z. T. auch an der gegenüber liegenden afrikanischen Küste verbreitet. Diese Arten sind *Alphitobius crenatus*, die beiden *Opatrinus*-Arten. Die eine *Heterophyllus*-Art ist von den madegassischen Verwandten so abweichend, dass von einer eigentlichen Verwandtschaft nicht mehr gesprochen werden kann. Vielleicht gehören auch die beiden *Plesioderes*-Arten hierher, von denen wenigstens die eine ausdrücklich für Madagaskar angegeben wird, während allerdings die andere nur von Mauritius, Réunion und vom Cap genannt wird. Sicher ist aber *Microcrypticus variegatus* als madegassische Form zu bezeichnen, sie ist auf Madagaskar weit verbreitet, findet sich aber ausser auf den Seychellen auch auf dem Festlande.

5. *Beziehungen zur afrikanischen Fauna.* Ich kann in der Seychellenfauna nur eine einzige, typisch afrikanische Art feststellen: *Gonocephalum simplex.* Es ist im ganzen tropischen und südlichen Afrika, ferner auf Madagaskar und allen Inseln gemein. Ich habe bei dieser Art (siehe den systematischen Teil) ausgeführt, dass *Gon. simplex* offenbar sehr geringe Ansprüche an die Umgebung stellt, sich daher leicht festsetzt und vermutlich erst in neuerer Zeit eingewandert ist.

6. *Beziehungen zu abgelegenen Gebieten.* Diese glaubt Kolbe in 2 endemischen Gattungen zu erkennen.

(*a*) Als *südamerikanisches* Element spricht er seine neue Gattung *Camarothelops* an. Tatsächlich gehört sie in die Verwandtschaft der südamerikanischen Gattung *Sphaerotus*, aber andere Verwandte leben auch in Afrika. Die neuen Gattungen der Gruppe der Misolampinen, zu der sowohl *Sphaerotus* als auch *Camarothelops* gehören, die ich aus Westafrika beschrieben habe, konnte Kolbe natürlich nicht kennen, auch besitzt er vermutlich eine noch unbeschriebene neue aus Ostafrika nicht, von der ich ein paar Stücke in meiner Sammlung habe. Aber gerade das bisher nicht vermutete Vorkommen der mit *Sphaerotus* verwandten Gattungen im tropischen Afrika zeigt wieder, wie vorsichtig man mit Katalogangaben sein muss. Ich habe an anderer Stelle ausgeführt (Nova Guinea XIII. 1920, p. 215), dass Kataloge nicht ein Bild tatsächlich vorhandener Verhältnisse geben, sondern nur eine Aufzählung von veröffentlichem Material. Wenn also bisher aus Afrika keine Sphaerotinen bekannt waren, so durfte man nicht, weil die Gattung *Camarothelops* mit *Sphaerotus* aus Südamerika verwandt ist, direkte Beziehungen zwischen Südamerika und den Seychellen konstruieren, es sei denn, dass nicht eine aufdringlich nahe Verwandtschaft festgestellt ist. Die möchte aber Kolbe annehmen. Er schreibt: "*Camarothelops* erinnert an *Sphaerotus* Südamerikas, von welcher Gattung sie sich in einigen unwesentlich scheinenden Merkmalen unterscheidet." Hier muss ich ihm entschieden wider-

sprechen. Das Fehlen einer scharfen Quernaht auf dem Kopfe, die ausgebildete Fühlerkeule, der Prosternalfortsatz (ein Merkmal, das bei den Misolampinen ganz ungewöhnlich ist), die scharfe Epipleuralkante, das ausgeschnittene Epistom, besonders aber das Vorhandensein einer eigenartigen Exudatsgrube auf dem Metasternum (die Kolbe nicht einmal erwähnt), ferner die sehr eigenartige Tarsenbildung sind sämtlich Merkmale, die jedes für sich allein die Aufstellung einer neuen Gattung rechtfertigen würden. Überdies scheint Kolbe ganz übersehen zu haben, dass auf dem nahe gelegenen Madagaskar 3 Misolampinengattungen vorkommen: *Moromelus*, *Sphaerocaulus* und *Piloxys*. *Camarothelops* ist nach meiner Auffassung vielmehr eine hochentwickelte endemische Gattung, die ohne nahe Beziehungen dasteht.

(*b*) *Pseudhadrus* Kolbe. Der Autor widmet dieser Gattung eine längere Auseinandersetzung zoogeographischer Art, auf die ich näher eingehen muss, weil er weitgehende Folgerungen daran knüpft. Er betrachtet sie als Angehörige der *Nyctozoilinen* einer Gruppe der *Helaeinen*, die bisher nur aus Australien und Neuseeland bekannt sind und betont ihre nahe Verwandtschaft mit *Pseudopatrum* von Neuseeland. Hier ist zunächst nomenklatorisch zu berichtigen, dass *Pseudopatrum* zusammenfällt mit *Mitua* und diesen älteren Namen zu führen hat. Auch der Name *Pseudhadrus* ist unglücklich gewählt, weil es schon eine Tenebrionidengattung *Pseudadrus* gibt. Kolbe knüpft an die vermeintlichen Verwandtschaftsbeziehungen von *Pseudhadrus* und *Mitua* weitgehende Folgerungen über Landverbindungen in der Urzeit. Es kann nicht meine Aufgabe sein, hier allgemein auf das Thema einzugehen, das muss ich berufeneren Federn überlassen, besonders Geologen. Ich habe es hier nur mit den Tenebrionidengattungen *Mitua* und *Pseudhadrus* zu tun, auf deren nahe "Verwandtschaft" (nicht etwa Ähnlichkeit) Kolbe seine Theorie stützt. Ich besitze beide Gattungen in authentisch bestimmten Stücken und kann Kolbes Angaben nachprüfen.

Es scheint mir von grundlegender Bedeutung zu sein, über die Begriffe "Verwandtschaft" und "Ähnlichkeit" ins Klare zu kommen, beide müssen scharf geschieden sein. Von wirklichen Verwandtschaftsbeziehungen dürfen wir nur bei wenigen Tieren reden. Sie sind geklärt bei vielen Säugern, Vögeln, Reptilien, bei wenigen Insekten, z. B. einigen Schmetterlingen. Eine weitgehende Übereinstimmung in morphologischen Merkmalen, besonders nur solcher des Hautskeletts, ist zwar in vielen Fällen ein Ausdruck der Verwandtschaft, aber keineswegs immer. Jeder Zoologe weiss, wie oft ein System irgend einer Tiergruppe umgearbeitet wird, und wie oft ein "natürliches" System, das auf die "Verwandtschaft" der betr. Tiere aufgebaut wird, ganz grundlegend geändert wird. Die Schwierigkeiten, die sich dem Systematiker unter den Entomologen entgegenstellen, sind ja so unendlich gross. Wir wussten z. B. bisher nichts von der Entwicklungsgeschichte der beiden oben genannten Gattungen. Die inneren Organe sind ganz unbekannt. So haben wir uns allein an Merkmale des äusseren Skeletts zu halten, um Verwandtschaftsbeziehungen zu untersuchen. Ich kann Kolbe, der beide Gattungen auf Grund von Merkmalen am Chitinskelett für äusserst nahe verwandt hält, nicht zustimmen. Ich gebe zu, dass sich zahlreiche Übereinstimmungen finden, die zuweilen überraschend sind. Aber bei Beurteilungen über den Wert dieser Übereinstimmungen sind doch einige wichtige Gesichtspunkte nicht ausser acht zu lassen: (*a*) die ausserordentliche Ähnlichkeit der

Tenebrioniden mit Coleopteren anderer Familien, (*b*) Wiederholungen von sehr ähnlichen Formen bei verschiedenen Unterfamilien der Tenebrioniden, (*c*) die Bedeutung von Merkmalen für die Gewinnung grosser oder kleiner systematischer Einheiten, oder mit andern Worten: welches sind Art-, welches Gattungs-, Unterfamilien- und Familienmerkmale? Es scheint mir hier der Ort zu sein, ganz kurz auf diese Sache einzugehen. Mangels anderer Merkmale aus der Entwicklungsgeschichte der Art, der inneren Organisation und beim Fehlen vorzeitlicher, verbindender Formen dürfen wir Gattungen als verwandt ansehen, die in allen Familien- und Unterfamilien-, evtl. Gattungsgruppenmerkmalen übereinstimmen; bei der Art müssen wir noch weiter heruntergehen. Es ist aber allgemein bekannt, dass sich bei Coleopteren nicht durchgehend bestimmte Eigenschaften als solche bezeichnen lassen, die Familien, oder Unterfamilien oder Gattungen, oder Arten scheiden. Der Wert dieser Merkmale ist vielmehr von Fall zu Fall zu entscheiden. Wo nicht ein sorgfältig durchgearbeitetes System einer Coleopterenfamilie vorliegt (und das ist leider nur bei sehr wenigen kleinen Familien der Fall), kann nur der erfahrene Spezialist entscheiden, ob Merkmale einen höheren systematischen Wert haben oder nicht. Im ersteren Falle darf er eine Verwandtschaft zugeben, im letzteren Falle darf er nur von einer Ähnlichkeit sprechen. Im allgemeinen sind z. B. Farben- und Skulpturmerkmale, Grösse, Längenverhältnisse der Gliedmassen und ihre Teile etc. etc. keine Eigenschaften, die höheren Wert haben, weil sie in allen möglichen Kombinationen in den verschiedensten Gruppen vorkommen. Im Gegensatz dazu sind bei den Tenebrioniden z. B. Grösse des Kinnes, das Vorhandensein oder Fehlen von Gelenkhäuten am Abdomen, die Hüftbildung, die Metasternalfurche, Bildung der Tarsen etc. vorzüglich geeignet, grosse systematische Gruppen zu bilden. Bei andern Käferfamilien sind es natürlich andere Merkmale, die als primäre Charaktere anzusprechen sind. Nur der Spezialist kann entscheiden, ob dieses oder jenes Merkmal ein primäres oder sekundäres ist, er allein entscheidet über "Verwandtschaft" und "Ähnlichkeit."

Auf unsern Fall von *Mitua* und *Pseudhadrus* angewandt, ergibt sich die Notwendigkeit, zu untersuchen, ob hier ein Fall rein äusserlicher, wenn auch recht weitgehender Ähnlichkeit vorhanden ist, oder ob auch die primären Charaktere übereinstimmen, wir also von Verwandtschaft sprechen können. Wir haben also alle Körperteile auf ihre Verschiedenheit, nicht nur auf ihre Übereinstimmungen in der Gestalt zu prüfen, und da ergeben sich doch ausser Unterschieden in Skulptur, Behaarung, Grösse, Gestalt noch wichtige Verschiedenheiten.

α. Mitua: Oberlippe ausgeschnitten, Epistom ausgerandet, eine Clypealnaht fehlt, 3. Fühlerglied über doppelt so lang wie 4 (also nach dem Schema der Unterfamilien mit grossem Kinn gebaut). Sämtliche Mundteile, die Seiten des Unterkopfes, das Unterkinn sind ganz anders gebaut als bei *Pseudhadrus*; Halsschild jederseits an der Basis ungerandet, Epipleuren innen durch eine Reihe lochartiger Gruben abgesetzt, das vorletzte Tarsenglied ist schräge abgeschnitten, das letzte nicht am Ende eingelenkt, sondern in dem ausgehöhlten Abschnitt des vorletzten: Bau nach dem Adeliiden-Typus.

β. Pseudhadrus: Oberlippe und Epistom gerade abgestutzt, Clypealnaht tief und scharf eingeschnitten, 3. Fühlerglied wenig länger als das 4., Halsschild jederseits an der Basis tief und stark gerandet, Epipleuren innen nicht abgesetzt, das letzte Tarsenglied

am gerade abgestutzten Ende des vorletzten eingelenkt: Bau nach dem Tenebrioniden-Typus.

Ich halte also dafür, dass diese scharfen Unterschiede verbieten, beide Gattung als verwandt anzusehen, ja selbst der Ausdruck "Ähnlichkeit" hat nur bedingt Geltung. Beide verglichenen Gattungen sind eigenartig und stehen recht isoliert, auch innerhalb der Gattungen ihres Faunengebietes. Für verfehlt halte ich es, die Gattungen als Hauptstütze für tiergeographische Spekulationen zu benutzen und kann den Satz: "Das Vorkommen dieses tiefstehenden Zweiges der Helaeinen auf den Seychellen ist für sich allein schon ein sprechender Beweis für die Zugehörigkeit dieser jetzigen Inselgruppe zu dem antarktisch-australischen Kontinent während einer sehr alten Zeitperiode" nicht gutheissen. Der Fall von *Mitua* und *Pseudhadrus* hat für den nichts Befremdliches, der weiss, in wie unglaublichem Masse die Tenebrioniden geneigt sind, Formen aus anderen Coleopterenfamilien zu wiederholen, "nachzuahmen." Es dürfte kaum eine Tiergruppe geben, die sich in dieser Beziehung mit den Tenebrioniden vergleichen liesse. Das ist auch Kolbe bekannt, und es erübrigt sich, besondere Beispiele anzuführen. Doch scheint er nicht beachtet zu haben, dass sich auch innerhalb der Familie, bei verschiedenen Unterfamilien, Habitusbilder von Gattungen wiederholen. Da sei erinnert an die systematisch weitauseinander stehenden Gattungen: *Salax—Gonocephalum*, *Bradymerus—Gonocephalum*, *Anisocerus—Helops*, *Diceroderes—Dysantes*, *Catomus—Catomulus*, *Eleodes—Coelocnemis* etc. Als solche Wiederholung ist auch *Mitua—Pseudhadrus* aufzufassen.

Ich habe diese Sache hier ausführlich erörtert, nicht, weil ich der systematischen Stellung der beiden Gattungen eine so grosse Wichtigkeit beimesse, sondern weil ich es für verfehlt halte, so wichtige Schlüsse auf Grund einer an und für sich auffallenden Einzelheit zu ziehen. Die Sache schien mir wichtig genug, einmal grundsätzlich Stellung zu nehmen zu den Tatsachen, die zuweilen einzelne Zoologen veranlassen, tiergeographische Theorien aufzubauen. Selbstverständlich liegt es mir ganz fern, dem ausgezeichneten Entomologen Kolbe persönlich nahe treten zu wollen. Ich erkenne vielmehr seine überragende Tüchtigkeit auf dem Gebiete der systematischen Entomologie rückhaltslos an.

Die leicht ins Auge fallenden Beziehungen der Seychellen zu den Faunen benachbarter Gebiete legte die Forderung nahe, bei Durcharbeitung des Materials auf Formen der indischen, madegassischen, afrikanischen Faunen zurückzugreifen, sie einem sorgfältigen Vergleich mit denen der Seychellen zu unterziehen. Der Erfolg dieser Untersuchungen lohnte die aufgewandte Mühe reichlich. Es stellte sich nämlich heraus, dass eine nicht unbeträchtliche Anzahl von Arten als Vertreter einer benachbarten Fauna noch einmal beschrieben wurde. So musste die Nomenklatur mehrfach umgestaltet werden. Da erfahrungsgemäss solche Änderungen leicht übersehen werden, gebe ich nachfolgend eine Zusammenstellung der in nachfolgender Arbeit vorgenommenen Umgestaltungen in der Nomenklatur:

1. *Neoabantis* Geb., 1911 (nom. nov. pro *Abantis* Fairm., 1892, *Abantiades* Fairm., 1894—nicht Herr.-Schäff., 1853) = subg. von *Diphyrrhynchus* Fairm., 1849.
2. *Opatrinus madagascariensis* Muls. und Rey, 1852 = *O. attenuatus* Klug, 1833.
3. *O. ater* Müll., 1883 = *O. insularis* Muls. und Rey, 1852.
4. *Phaleria attenuata* Fairm., 1895 = *Ph. pallida* Lew., 1894.

5. *Epeurycaulus* Kolbe, 1902 = *Plesioderes* Muls., 1860.
6. *E. aldabricus* Kolbe, 1902 = *Pl. madagascariensis* Muls., 1860.
7. *E. burbonicus* Kolbe, 1902 = *Pl. coriaceus* Muls., 1860.
8. *Pycna cavifrons* Fairm. = gen. *Tagalus* Geb.
9. *Uloma hondana* Kolbe, 1897 = *U. intrusicollis* Fairm., 1868.
10. *Anthracias* Redt., 1858 = *Cryphaeus* Kl., 1833.
11. *Cryphaeus aries* Kl., 1833 und *Anthracias favareli* Pic, 1913 und *Anthr. subnitidus* Pic, 1913 und *Anthr. nitidior* Pic, 1913 = *Cryphaeus taurus* F. (sub *Toxicum*), 1801.
12. *Dysceladus* Waterh., 1875 = *Pulposipes* Sol., 1848.
13. *Dysc. tuberculatus* Wat., 1875 = *Pulp. herculeanus* Sol., 1848.
14. *Uloma thoracica* Geb., 1912 = *Ul. spectabilis* Perty, 1831.
15. *Lagriola* Kirsch = *Paratenetus* Spin.
16. *Phaleria cistelina* Kl. = gen. *Eutochia.*
17. *Eutochia vidua* Fairm., 1871 = *Eut. cistelina* Kl., 1833.
18. *Tenebriomimus* Kolbe, 1901 = *Martianus* Fairm., 1893.
19. *Tenebriomimus adansoniarum* Kolbe, 1901 = *Mart. castaneus* Fairm., 1893.
20. *Hoplocephala longula* Geb., 1910 = *Mart. castaneus* Fairm., 1893.
21. *Bolitopertha* Geb., 1910 = *Cherostus* Waterhouse, 1894.

SYSTEMATISCHER TEIL*.

Subfam. **Pedininae.**

Die Pedininen, zum grossen Teil ungeflügelt, sind meist Festlandstiere, oder doch auf grösseren Inseln zu Hause. Südostafrika hat zahlreiche Gattungen und Arten, Madagaskar nur wenige Vertreter. Indien beherbergt die Riesen der Unterfamilie, die Gattungen *Platynotus* und *Pseudoblaps*, auf den Sundainseln kommt nur noch die unscheinbare *Pseudoblaps javana* vor. Auf den unserer Fauna benachbarten Inselgruppen: Comoren und Aldabra-Inseln sind bisher nur *Opatrinus insularis* und *madagascariensis*, ferner *Mesomorphus villiger* festgestellt, auf den Seychellen dagegen keine Art. Hier wird nun zunächst die Gattung *Diphyrrhynchus* (subg. *Abantiades*) für die Seychellen und Aldabra-Inseln konstatiert, deren eigentliche Heimat das papuanische Gebiet, Neu-Caledonien etc. zu sein scheint. Auch die beiden *Opatrinus*-Arten wurden aufgefunden.

Diphyrrhynchus, Fairm.

Fairm., Rev. Zool. 1849, p. 445. Lacord., Gen. Col. v. 1859, p. 309. Bates, Trans. Ent. Soc. Lond. 1872, p. 267. Champ., Trans. Ent. Soc. Lond. 1894, p. 366.

Acanthosternus Montr., Ann. Soc. Ent. Fr. (3) viii. 1860, p. 289.

Subg. *Neoabantis* Geb., Col. Cat. pars 22, 1910, p. 341.

Abantiades Fairm., Ann. Soc. Ent. Belg. xxxviii. 1894, p. 395 (nom praeocc.).

Abantis Fairm., Rev. d'Ent. xi. 1892, p. 109 (nom praeocc.).

[* The types of all the new species will be placed in the British Museum, except that of *Uloma comorensis*, which is in the Berlin Museum. Paratypes in the Cambridge University Museum and in the author's collection. H. S.]

Die Gattung *Diphyrrhynchus* wurde von Fairmaire zu den Diaperinen gestellt, auch Lacordaire und Bates rechnen sie zu derselben Unterfamilie. Champion dagegen begründet die von ihm angenommene Stellung bei den Phaleriinen. Ich habe in Nova Guinea XIII. p. 226 auseinandergesetzt, dass unsere Gattung ihre natürliche Stellung bei den Pedininen haben muss, das ausgeschnittene Epistom und die erweiterten Vordertarsen der ♂ sind Merkmale, welche sie dieser Unterfamilie zuweisen. Eigentümlich ist, dass Fairmaire seine Gattung *Abantis*, die doch von *Diphyrrhynchus* kaum zu unterscheiden ist, neben *Clitobius* zu den Opatrinen stellt. Eine Prüfung der beiden typischen Arten *Diph. chalceus* Fairm. und *Ab. aenescens* zeigt aber die ausserordentlich nahe Verwandtschaft beider Gattungen. Zwar finden sich eine Reihe von Unterschieden, die aber durch die zahlreichen andern als *Diphyrrhynchus* beschriebenen Arten überbrückt werden. *D. chalceus* weicht von *D. aenescens* durch den breiten, hochgewölbten Körper, durch die beim ♂ hornartig aufgebogenen Ecken des Epistoms, durch spitzen Prosternalfortsatz ab. Nur die ersten beiden Merkmale sind für *chalceus* allein zutreffend, im übrigen zeigen alle andern Arten inbezug auf die Bildung der Fühler, der sekundären männlichen Geschlechtsmerkmale an den Füssen, der Bildung des Prosternalfortsatzes, der Deckenskulptur etc. starke Verschiedenheiten unter sich, so dass an eine durchgreifende Scheidung nicht zu denken ist.

Nur *D. geminatus* All. gehört nicht zur Gattung (der Fundort: Sikkim liess von vornherein die Zugehörigkeit zweifelhaft erscheinen, da alle bekannten Arten den Meeresstrand bewohnen). Lesne weist nach, dass diese Art eine echte *Chrysomela* ist, ein Versehen, wie es nur Allard fertig bringt.

Ich halte es nach den eben gemachten Ausführungen für das beste, *Neoabantis* als Untergattung von *Diphyrrhynchus* aufzufassen, es gehören bis auf *chalceus*, soweit ich sehe, alle beschriebenen Arten von *Diphyrrhynchus* hierzu. Nach Erscheinen meines Katalogs sind noch *D. semisulcatus* von Batjan und *D. meligethoides* von Neu-Guinea beschrieben (s. Gebien: Nova Guinea XIII. pp. 226, 227).

Die Gattung ist sehr weit verbreitet, sie hat Arten in West- und N.W.-Australien, Neu-Caledonien, Neu-Seeland, Tonga- und Viti-Inseln, Neu-Guinea, Key-Inseln, Batjan, Nicobaren, Ceylon, Obock, Seychellen, Aldabra-Inseln, Ostafrika.

1. *Diphyrrhynchus* (subg. *Neoabantis*) *effeminatus*, n. sp.

Lang, ziemlich parallel, flach, von der Gestalt einer gestreckten *Amara*, braun metallisch, Fühler und Beine gelblich.

Der *Kopf* is flach, vorn aufgebogen, beim ♂ ohne vorragende Ecken des Epistoms. Die Augen sind gross, grob fazettiert, vorn kaum ausgeschnitten, der Vorderkopf verengt sich geradlinig stark nach vorn. Die Wangen stossen nicht direkt auf die Augen, sondern zwischen beiden ist ein winziger Einschnitt; die Ecken des Epistoms sind sehr kurz verrundet rechtwinklig; der Ausschnitt ist halbkreisförmig, in seiner Mitte hinten nicht gerade, auch die grosse Oberlippe ist leicht ausgeschnitten. Die Quernaht ist als sehr leichter Eindruck kaum angedeutet, die Punktierung ist scharf, aber sehr fein und nicht eng, kaum gröber als die des Pronotums. Die Fühler sind schlank, Glied 1 ist das dickste, 3 fast doppelt so lang wie 2, sehr gestreckt, $1\frac{1}{2}$ mal so lang wie 4, 4—6 sind deutlich länger als dick, sie nehmen an Länge ab, 7 ist so breit wie lang, auf beiden Seiten gerundet, 8—10 sind kräftig quer,

11 so breit wie lang, von fast kreisförmigem Umriss, mit blanker Basalhälfte. Eine eigentliche Keule ist also nicht abgesetzt, da Glied 7 nicht plötzlich breiter ist. Das Mentum liegt nicht vertieft, es ist kräftig gehöckert, die Mandibeln sind am Ende breit gefurcht. Das Endglied der Maxillarpalpen ist beilförmig.

Der *Halsschild* ist an der Basis nicht ganz doppelt so breit wie in der Mittellinie lang, sehr flach, vor der Basis findet sich an jeder Seite ein kräftiger, meist querer Eindruck. Die Seiten sind in der Endhälfte parallel, dann stark nach vorn verengt, der Vorderrand ist ganz gerade abgeschnitten, die Vorderecken sind breit verrundet, die hinteren ziemlich scharf rechtwinklig. Die Punktierung ist sehr fein und nicht sehr dicht. Der ganze Halsschild ist im Gegensatz zu fast allen Arten blank, aber unter sehr starker Vergrösserung erkennt man doch bei hellem Licht die charakteristische lederartige Grundskulptur, die sich in ein äusserst feines Netzwerk von winzigen Strichelchen auflöst. Die Spitzenrandung ist in der Mitte breit unterbrochen. Das Schildchen ist gross, spiegelblank, seine Spitze leicht vorgezogen.

Die *Flügeldecken* sind ziemlich parallelseitig, flach, ihre Seitenrandkante ist von oben sichtbar. Es sind wohlausgebildete Punktreihen vorhanden, die nur hart an der Basis undeutlich werden, auch die seitlichen Streifen sind gut entwickelt. Die Zwischenräume sind ganz flach, nur gegen die Spitze sind die Streifen leicht vertieft und demgemäss die Zwischenräume gewölbt, diese sind wie das Pronotum punktiert.

Die *Unterseite* erscheint auf den ersten Blick nackt, doch sind, nur bei starker Vergrösserung sichtbar, äusserst feine, kurze, anliegende Härchen vorhanden. Das Prosternum ist kräftig punktiert, zwischen den Hüften jederseits sehr fein gerandet, der Fortsatz ist querüber stark gerundet und senkt sich nach hinten, ragt wenig über die Hüften. Die Propleuren sind fein, rund, scharf gekörnt, weiter nach hinten leicht längsrunzlig. Das Mesosternum ist stark rinnig vertieft, die Seiten des Eindrucks sind dick, nicht scharfkantig. Das Abdomen ist sehr deutlich, aber verhältnismässig fein punktiert, das Analsegment ist äusserst fein gerandet, seine Spitze nicht abgestutzt. Die Beine sind zart, sehr viel schlanker als bei *chalceus* und *aenescens*; die Vorderschienen sind gegen das Ende mässig stark verbreitert, das Ende ist aussen nicht verrundet, sondern ziemlich scharfeckig. Alle Schienen sind stark stachelig, die vorderen auch besonders an der Hinterseite. An den Hinterschienen finden sich am Ende ausser den Enddornen noch nach aussen einige nur wenig schwächere Stacheln. An den Vorderfüssen sind in beiden Geschlechtern das 2. und 3. verbreitert, beim ♂ nur wenig breiter als beim ♀, die Mittelfüsse sind nur beim ♂ erweitert, aber ihre mittleren Glieder sind nicht breiter als lang. An den Hintertarsen ist Glied 1 wesentlich länger als 2 + 3.

L. 5—5·4 mm.; Br. 2·2—2·5 mm.

30 Exemplare.

Loc. Seychellen: Long Island, vii. 1908; Bird Island, viii. 1908 (Fryer). Assumption, ix. 1908. Aldabra: Île Michel, x. 1908; Picard I., i. 1909 (Fryer).

Die Arten von *Diphyrrhynchus* sind, abgesehen von dem leicht kenntlichen *D. chalceus*, einander sehr ähnlich, haben aber doch gute Merkmale. Unsere Art ist, verglichen mit dem im Osten weit verbreiteten *D. nicobaricus*, wesentlich schlanker und flacher, braun metallisch gefärbt, stark glänzend und besonders durch die Schienbildung leicht zu unterscheiden:

die Vorderschienen sind nämlich aussen am Ende verrundet, ähnlich wie bei *Phaleria*, nicht eckig. Merkwürdig ist, dass bei unserer Art die Vordertarsen in beiden Geschlechtern verbreitert sind, wenn auch nicht sehr stark. *D. aenescens* ist viel kleiner als unsere Art, hat beim ♂ stark verbreiterte Tarsen, hinten stark gefurchte Decken, stumpfe Hinterecken des Pronotums, viel stärker behaarte Unterseite und beim ♂ ein etwas abgestutztes Analsegment. Die östlichen Arten, ausgenommen eine neue von Ceylon, stehen viel ferner. Von dieser neuen unterscheidet sie sich durch bedeutendere Grösse, dunklere Färbung (denn die neue Art ist fast so hell wie *Phaleria* gefärbt), längere Fühler, anderen Ausschnitt des Epistoms. Sehr nahe verwandt dagegen ist die folgende Art, bei deren Beschreibung sich die Unterschiede angegeben finden.

2. *Diphyrrhynchus* (subg. *Neoabantis*) *fryeri*, n. sp.

(Tafel **23**, Fig. 18; Textfig. 1.)

Sehr schlank, flach, glänzend kohlschwarz, einem *Alphitobius diaperinus* nicht unähnlich, Fühler und Füsse schwarzbraun.

Der *Kopf* ist flach, beim ♂ nicht ausgezeichnet, die Ecken des Epistoms sind leicht angedrückt, dieses selbst ist halbkreisförmig ausgeschnitten, die Ecken sind verrundet, die Seiten des Vorderkopfes sind nicht geradlinig, sondern im Bogen verengt. Die Augen nehmen ungefähr $\frac{1}{3}$ der Stirnbreite ein. Die Punktierung ist zwar fein, aber sehr deutlich, viel gröber als die des Pronotums, die schlanken Fühler sind wie bei der vorigen Art gebaut. Das Mentum ist stark gehöckert, das Endglied der Palpen beilförmig, die Mandibeln sind am Ende kurz und sehr breit gefurcht.

Der *Halsschild* ist fast doppelt so breit wie lang, ziemlich lang, die Basis ist fast, die Spitze ganz gerade abgestutzt, die Vorderecken sind verrundet, die hinteren rechtwinklig. Die Seiten sind von der Basis an nach vorn verengt, an der Basis findet sich jederseits ein leichter Eindruck. Die Punktierung ist ausserordentlich fein und nicht eng, übrigens bei den Stücken der Inseln noch feiner als bei den Tieren des Festlandes. Der Grund ist mikroskopisch fein lederrunzlig, aber so zart, dass noch ein ziemlich kräftiger Glanz vorhanden ist.

Die *Flügeldecken* sind an den Seiten kräftig gerundet, die Randkante ist von oben ganz sichtbar. Es sind vollständig ausgebildete Punktreihen vorhanden, die auch an der Basis deutlich sind, auch alle seitlichen sind ausgebildet, von der Mitte an sind die Reihen leicht vertieft, nach hinten allmählich stärker, die Zwischenräume sind hinten kräftig gewölbt, sie sind so fein wie der Halsschild punktiert.

Die *Unterseite* ist nahezu nackt, die Haare des Abdomens sind in der Mitte so fein, dass sie nur bei sehr starker Vergrösserung als Stäubchen sichtbar sind, die nicht über den Hinterrand ihres Punktes hinausgehen, an den Seiten sind sie etwas länger. Das Prosternum ist wagerecht, hinten ziemlich spitz, querüber gerundet, neben den Hüften kurz und kräftig gefurcht. Die Propleuren sind stark granuliert und deutlich längsrunzlig. Das Mesosternum ist tief rinnig eingedrückt, der Eindruck geht an die Hinterbrust. Das Abdomen ist kräftig punktiert, das Analsegment fein, aber vollständig und scharf gerandet. Die Beine sind

sehr zart und dünn, wie bei der vorigen Art, die Vorderschienen (s. Fig. 1) schwach zur Spitze verbreitert, mit deutlicher Ecke. Auch bei dieser Art sind die Vorderfüsse in beiden Geschlechtern erweitert, die Mittelfüsse nur beim ♂.

Fig. 1. *Diphyrrhynchus fryeri*, Vorderbein des ♂, × 35.

L. 6·2—7·1 mm.

Loc. Aldabra-Inseln (Fryer): Île Michel, x. 1908; Picard I., i. 1909. Ostafrika: Dar es Salaam (Dr F. Eichelbaum); Kurasini; Portug. Ostafrika, Beira (A. Bodong).

Diese Art ist der vorigen nahe verwandt, wie diese sehr schlank und flach, mit ähnlicher Deckenskulptur und stimmt mit ihr besonders darin überein, dass in beiden Geschlechtern die Vordertarsen erweitert sind. Sie unterscheidet sich durch bedeutendere Grösse, kohlschwarze Farbe, kräftiger punktierten Kopf, von der Basis an verengten Halsschild, gröber granulierte Propleuren etc.

D. fryeri ist offenbar weit verbreitet und ich nahm an, dass sie schon von älteren Autoren beschrieben sein müsste, zumal die ostafrikanische Fauna schon recht bekannt ist, aber ich finde keine Beschreibung, die ich auf unsere Art deuten könnte.

Opatrinus, Latr.

Latr., Règne anim. ed. II. tom. v. 1829, p. 19. Muls. et Rey, Mém. Acad. Lyon, 1852, p. 295; Opusc. Ent. IV. 1853, p. 70. Lacord., Gen. Col. v. 1859, p. 240. Reitt., Best. Tab. LIII. 1904, pp. 51, 76.

Subgen. *Zodinus* Muls. et Rey, *l.c.*, p. 315; *l.c.*, p. 90.

Die Gattung *Opatrinus* ist in der alten und neuen Welt weit verbreitet: in Amerika findet sie sich von den südlichen Vereinigten Staaten bis nach Argentinien, in Afrika überall bis auf den südlichsten Teil. Ferner hat Fairmaire eine mir unbekannt gebliebene Art: *O. annamitus* aus Cochinchina beschrieben, die möglicherweise nicht zur Gattung gehört. Er vergleicht die Art mit *O. semicribrosus* aus Guinea, der nie beschrieben wurde.

Eine genaue Untersuchung besonders aller amerikanischen Arten ist nötig, um festzustellen, ob sie wirklich mit den afrikanischen in eine Gattung gehören. Das Verbreitungsgebiet ist, den bisherigen Umfang der Gattung angenommen, keineswegs natürlich. Unter den auf dem Boden lebenden Tenebrioniden finde ich keine Gattung mit ähnlicher Verbreitung. Die sehr weit verbreitete Gattung *Gonocephalum* findet sich nur in der alten Welt. Weltweit oder fast kosmopolitisch verbreitete Bodentenebrioniden gibt es nicht. Alle Gattungen, die so weit verbreitet sind, sind an die Baumvegetation gebunden, in dem sie entweder ihre Verwandlung in morschem Holz durchmachen, oder in Baumschwämmen leben: *Platydema, Uloma, Strongylium, Hoplocephala, Eutochia, Doliema* etc.

Die beiden hier aufgeführten Arten sind viel weiter verbreitet als man bisher annahm, beide sind nicht nur auf Madagaskar und den Inseln heimisch, sondern auch in Ostafrika.

3. *Opatrinus insularis*, Muls.

Muls., Mém. Acad. Lyon, 1852, p. 320; Opusc. Ent. IV. 1853, p. 95. Chat., Ann. Soc. Ent. Fr. LXXXII. 1913, p. 765, f. 1, 2.

ater Müll., Tijdschr. Entom. XXX. 1887, p. 301, t. 12, f. 4.

Chatanay hat diese Art scharf von *O. madagascariensis* geschieden, nur zu erwähnen vergessen, dass diese Art ganz verkümmerte, die folgende dagegen vollständig entwickelte Unterflügel hat. Nach ihm kommt die Art vor auf Madagaskar (Diego Suarez) und den Comoren (Mayotte). Ich besitze sie von Madagaskar (Ostimerina; Andrangoloaka); Nossi Bé; Comoren (Mayotte, 31. xii. 1900, Tschitschérine); Ostafrika (Nguelo in Usambara). Ferner liegt mir die Art in beträchtlicher Zahl vor von den Comoren: Moheli u. Gr. Comore (Voeltzkow). Die Exemplare von Usambara hatte ich als *O. ater* Müll. bestimmt, und tatsächlich passt die Beschreibung genau auf die Tiere, so dass ich keine Zweifel hegte, dass *O. ater* als synonym zu *O. insularis* anzusehen ist. Auf meine Bitte wurden mir die Typen von *O. ater* aus der Zool. Staatssammlung München freundlichst geliehen. Eine Prüfung ergab die Gleichheit von *ater* und *insularis*.

Loc. 1 ♂, 2 ♀ von den Seychellen. Mahé: Port Victoria.

4. *Opatrinus attenuatus*, Kl.

Ins. Madag. 1833, p. 88.

Syn. *madagascariensis* Muls., *loc. cit.*, p. 219; *loc. cit.*, pp. 90, 94. Chat., *loc. cit.*, p. 766.

Diese Art ist durch die Beinbildung der ♂ gut von der vorigen geschieden: es fehlt die zahnartige Erweiterung an den Mittelschienen und die Hinterschienen sind kräftig gekrümmt, überdies sind die Propleuren grob punktiert und die Punkte des Halsschildes sind viel gröber, die der Deckenstreifen dagegen viel feiner und stehen wesentlich enger.

Loc. Madagaskar: verschiedene Fundorte.

Portug. Ostafrika: Beira (A. Bodong).

Comoren: auf den Inseln Anjouan, Grande Comore, Moheli.

Aldabra-Inseln: Cosmoledo, 1907; Aldabra, Takamaka (Fryer).

Klugs Typen im Berliner Museum haben mir vorgelegen.

Subfam. **Phaleriinae.**

Die Angehörigen dieser Unterfamilie scheinen ohne Unterschied Bewohner des Meeresstrandes zu sein, sie leben von tierischen Stoffen, faulenden Fischen, unter Tang. Die ausserordentlich weite Verbreitung der Gattung *Phaleria* (sie findet sich in Europa, Afrika, Asien, Amerika und selbst auf sehr isolierten ozeanischen Inseln: Galapagos Ins., Ins. Ascencion), wird durch ihre Lebensweise leicht erklärlich. Die Arten selbst sind dagegen meist nicht weit verbreitet, aber einander oft täuschend ähnlich.

Der Katalog weist aber eine Anzahl Arten auf (s. Gebien: Col. Cat., pars 22, p. 345), die besser in anderen Gattungen unterzubringen sind. Es haben mehrere Autoren versucht, neue Gattungen für einzelne Arten aufzustellen, die sich aber nicht allgemeiner Anerkennung erfreuen. Ich glaube aber, wir dürfen bei der im allgemeinen so homogenen Gattung nicht einen so strengen Massstat an den Wert von Gattungscharakteren legen, wie bei

andern Genera, denn die Gattung *Phaleria* droht, zumal viele Arten ungemein variabel sind, sehr unübersichtlich zu werden. So ist für *Ph. riederi* die Gattung *Emypsara* aufgestellt für *subhumeralis*: *Phaleromala*, für *capensis* und *fimbriata* die Gattung *Pachyphaleria*. Lewis hat 1893 für mehrere Arten (*atriceps*, *pallida*, *pusilla*) die neue Gattung *Epiphaleria* gegründet, die genauerer Untersuchung wert ist. Sie ist ausgezeichnet durch sehr grosse Augen, die unten bis unter den Maxillarausschnitt reichen, durch lange Hinterbrust und dementsprechend durch gestreckten, flachen Körper und wohlentwickelte Flügel. Eine Prüfung der exotischen Arten ergibt, dass ausser den genannten 3, noch zahlreiche andere hineingehören. Leider ist es mir nicht möglich, eine lückenlose Aufteilung der Gattung *Phaleria* zu geben, da mir in meiner Sammlung viele Arten fehlen und ein Spezialstudium der Gattung bei Gelegenheit der vorliegenden Arbeit nicht beabsichtigt ist. Es gehören aber zu *Epiphaleria* ausser den genannten 3 Arten noch: *Ph. encausta* Fairm., *parallela* Woll., *clarki* Woll., *planata* Woll., *prolixa* Fairm. (=*aegyptiaca* Seidl., *munda* Walk., *fuscata* Fairm., *lateralis* Reitt.), *ellipsodes* Fairm., ferner vermutlich alle madegassischen Arten und die meisten Amerikaner (mit Ausnahme von *globosa*, für die eine neue Gattung errichtet werden muss, *bisignata* Boh. und vielleicht einigen andern, die mir unbekannt sind).

5. *Epiphaleria pallida*, Lew. (Textfig. 2).

Ann. Mag. (6) XIII. 1894, p. 383.

attenuata Fairm., Ann. Soc. Ent. Belg. XXXIX. 1895, p. 445.

Diese Art liegt mir in Anzahl aus dem Deutschen Ent. Mus. und in meiner Sammlung von Ceylon vor (Bentotta, Weligama, Trincomali, Putalam, sämtlich W. Horn leg.).

Fig. 2. *Epiphaleria pallida*, Lew., Vorderbein, × 40.

Ein sorgfältiger Vergleich dieser Tiere mit den zahlreichen von den Seychellen mitgebrachten Tieren, welche Fairmaire als *Ph. attenuata* beschrieben hat, zeigt die Gleichheit beider Arten. Ganz geringe Verschiedenheiten sind durchaus individuell. Das Ergebnis dieser Prüfung ist insofern von Interesse, als hier abermals die nahe Beziehung der Inselfauna zu Ceylon bewiesen wird.

Loc. Seychellen. Bird Island, vii. 1908 (Fryer). Long Island, vii. 1908. Mahé: "country near sea-level."

Subfam. **Opatrinae**.

Diese Unterfamilie ist auf der ganzen Welt verbreitet mit Ausnahme von Amerika. Zwar sind 2 Gattungen: eine aus Nord-, die andere aus Südamerika bekannt, aber die erste: *Ammodonus* ist offenbar = *Scaptes* und daher eine Leichenine und ebendahin soll auch die zweite: *Ostorius* gehören. Es ist daher das Verbreitungsgebiet ein recht geschlossenes: Europa, ganz Afrika, ganz Asien, alle grösseren Inseln, Australien. Das ist zugleich das Gebiet der Gattung *Gonocephalum* und ebenfalls *Caedius* hat fast dieselbe Verbreitung, fehlt jedoch in beschränkten Gebieten, auch in Europa. Die Arten, besonders die der Gattung *Gonocephalum*, sind ungemein schwierig zu unterscheiden, die Synonymie ist noch nicht geklärt und zahlreiche Arten sind noch unbeschrieben. Auf den Seychellen ist die gemeinste Art,

und zugleich wohl der gemeinste Käfer überhaupt: *Gonocephalum simplex*, F., eine Art, die in ganz Afrika zuhause ist, überall in den Kulturgebieten auftritt und in Kamerun z. B. dem Tabak schädlich geworden ist. Diese Art und auch die zweite: *Gon. micantipenne* sind offenbar afrikanische Elemente, von denen ich eine neuere Einwanderung auf die Inseln annehmen möchte.

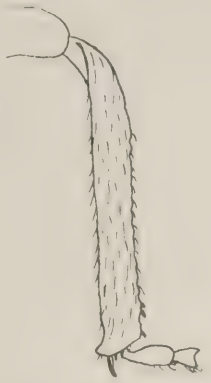


Fig. 3. *Gonocephalum micantipenne*, Fairm., Mittelschiene des Männchens, × 24.

6. *Gonocephalum micantipenne*, Fairm. (Textfig. 3).

Bull. Soc. Ent. Fr. 1893, p. cccxxiv. Chatanay, Ann. Soc. Ent. Fr. LXXXII. 1913, p. 768 fig.

peregrinum, Kolbe, Abh. Senckenb. Naturf. Ges. XXII. Heft 4, 1902, p. 576.

Fairmaire's Beschreibung der Art ist dürftig. Erfreulicherweise hat der gewissenhafte Chatanay weitere Mitteilungen über die Art gegeben und eine gute Abbildung des Kopfes und der Hinterschienen hinzugefügt. Von Kolbe's Art liegt mir authentisches Material in genügender Menge vor. Ich kann also die Identität der beiden Arten, die schon Chatanay vermutete, bestätigen. Das Tier scheint auf den Inselgruppen sehr häufig zu sein.

Loc. Aldabra: Takamaka und Île Michel, xi. 1908; Picard Island, i. 1909 (sämtlich von J. C. F. Fryer gesammelt).

Seychellen. Mahé, 1909. Long Island, vii. 1908. Silhouette, "near Mont Pot-à-eau over 1000′, viii. 1908; low country near sea, viii. 1908." Bird Island, vii. 1908 (Fryer). Dennis Island, viii. 1908 (Fryer). Praslin, 1905 und 1908. Cerf Island (A. Brauer).

Coetivy, 1905.

Cargados Islands: Siren Island (Gardiner, 27. viii. 1905).

Weiter aus der Litteratur bekannt:

Nord-Madagaskar (Vohemar, Ambohitsara).

Comoren: Pamanzi; Anjouan.

Ostafrika, Somali. Ins. Juan de Nova im Kanal v. Mozambik, vii. 1894 (A. Voeltzkow). In grosser Zahl auch aus dem Berliner Museum.

7. *Gonocephalum simplex*, F.*

Diese Art ist im ganzen tropischen und südlichen Afrika gemein, ferner auf den Inseln. Sie ist nicht unerheblich variabel und zwar nicht nur, wenn man Tiere verschiedener Herkunft betrachtet, auch ein reicheres Material aus einer und derselben Gegend zeigt z. T. nicht geringe Verschiedenheiten. Leider liegt mir gegenwärtig nur ein Teil der in meiner Sammlung enthaltenen Tiere dieser Art vor, so dass ich nicht untersuchen kann, ob bestimmte Rassen angenommen werden müssen. Die Stammform von Guinea ist aber flacher als die Tiere von den ostafrikanischen Inseln, bei ihr (dem echten *simplex*) ist der Seitenrand der Decken auf sehr lange Strecke gut sichtbar; die Behaarung ist kürzer, mehr anliegend, die Grundskulptur sehr fein. Bei den Tieren von den Seychellen, Madagaskar etc. sind die Decken stärker gewölbt, der Seitenrand ist von oben nur unmittelbar an der

* Ausführliche Litteraturangaben finden sich in Gebien, Col. Cat. pars 22, p. 326.

Schulter sichtbar, die Punkte der Streifen sind gröber, die Haare mehr abstehend, krumm. Beide Formen sind also gut zu scheiden. Ich verzichte aber darauf, die Art aufzuteilen, weil mir nicht genügend Material von allen Fundorten vorliegt (aus dem eigentlichen Afrika nur ca. 20 Stück) und nenne mit Vorbehalt die Art von den Seychellen ebenfalls *G. simplex*. Übrigens sind die Tiere von dorther (mir liegen ca. 360 Tiere vor) unter sich variabel: die Punkte der Streifen sind gröber oder feiner, die alternierenden Zwischenräume oft mehr erhaben und breiter als die übrigen, zuweilen aber ganz gleichartig, die Färbung ist je nach dem Boden verschieden, schwarz, grau, rötlich.

Loc. Seychellen. Mahé: Cascade Estate, 800—1000′, i. 1909; Mamelles, vi., vii. (A. Brauer). Praslin, xi. 1908. Silhouette: "near Mont Pot-à-eau, over 1000′, viii. 1908; low country near sea, viii. 1908; Mare aux Cochons, on or quite near the plateau, ix. 1908." Dennis Island, viii. 1908 (Fryer). Bird Island, vii. 1908 (Fryer). Frigate Island.

Amiranten: Eagle, Desroches, Darros Islands (1905).

Farquhar Atoll (1905).

Cargados: Siren Island (Gardiner, 27. viii. 1905).

Coetivy (1905).

Aldabra: Picard Island, i. 1909; Takamaka und Île Michel, xi. 1908 (Fryer).

Astove Island, Cosmoledo Island (1907, Thomasset).

Rodriguez (Snell und Thomasset, 1918).

Aus den angeführten genaueren Fundangaben ergibt sich, dass die Art überall zu finden ist: nahe der See und auf den höchsten Punkten der Inseln, im Kultur- und im Urwaldgebiet. Sie scheint also an ihre Umgebung wenig Ansprüche zu stellen, das erklärt ihre weite Verbreitung.

Opatropis, Reitt.

Best. Tab. liii. 1904 in Verh. Naturf. Ver. Brünn, pp. 134, 159.

8. *Opatropis blairi*, n. sp. (Textfig. 4).

O. tarsalis, Blair, *i. l.*

Der gemeinen *O. hispida* Brll. vom Festland Afrika in Gestalt und Grösse gleich, schwärzlich, glänzend, durch kurze Behaarung grau erscheinend. Reine Stücke sind wegen der regelmässigen Behaarung weisslich grau.

Der *Kopf* ist flach, er hat die Spur von Augenfalten. Die Lappen des Clypeus sind sehr gross, halbkreisförmig, die Wangen sind an den Seiten weit abgeschnitten, diese laufen also fast parallel, bei einem Exemplar von Astove-Island sind sie dort leicht eingezogen, sie verschmälern sich nach hinten etwas. Die Quernaht ist deutlich breit eingedrückt. Die Beschuppung liegt an, sie ist auf den Lappen des Epistoms nach hinten, in der Quernaht nach innen gerichtet und auf der Stirn und hinten nach einem Punkt zu, der in der Mitte, etwas hinter den Augen liegt. Die Schuppen sind anliegend, ungefähr doppelt so lang wie breit, also nicht haarförmig. Die Fühler sind dünn, sie erreichen die Mitte des Pronotums: Glied 3 ist ungefähr $1\frac{1}{2}$ mal so lang wie 4, beide sind fast zylindrisch, 5 und 6 etwas länger als breit, zur Spitze etwas erweitert, die letzten 5 bilden eine deutlich abgesetzte Keule, 7 ist so breit wie lang, die folgenden werden etwas stärker quer, das vorletzte ist $1\frac{1}{2}$ mal so breit wie lang. Das Mentum ist so breit wie lang, mit fein erhabenem

Mittelkiel versehen und jederseits länglich grubenförmig eingedrückt; der Raum zwischen Auge und Maxillarausschnitt ist so breit wie dieser selbst. Die Grundglieder der Maxillen sind wie das Mentum rauh punktiert und beborstet.

Der *Halsschild* ist über doppelt so breit wie von Vorder- zur Hinterecke gemessen lang, die ersteren ragen kräftig vor, sind aber in der Randkante verrundet. Gegenüber dem 5. Zwischenraum findet sich eine breite Ausbuchtung und davor ein kräftiger Eindruck, die Hinterecken sind sehr scharf recht- fast spitzwinklig. Die Punktierung ist grob und dicht, aber sehr flach, die Zwischenräume der Punkte bilden ein glänzendes, unregelmässig erhabenes Netzwerk; Körner fehlen. Jeder Punkt hat ein sehr kurzes, anliegendes Börstchen: bei den Exemplaren von den Inseln sind die Borsten kaum doppelt so lang wie breit, bei denen vom Festland und der Insel Patta viel länger.

Die Seitenrandkante der *Flügeldecken* ist von oben nirgend sichtbar; die Zwischenräume sind leicht gewölbt, mit sehr feinen Graneln versehen, jedes Körnchen mit winzigen, anliegenden Schuppenbörstchen. Die Punkte der Streifen sind sehr deutlich, nackt oder tragen ein äusserst kurzes, mikroskopisch feines Härchen.

Das *Prosternum* ist zwischen den Hüften ziemlich breit, hinten ganz niedergebogen, das Mesosternum ist kaum eingedrückt, Pro- und Epipleuren sind fein und scharf gekörnt und wie die Oberseite fein beschuppt. Das Metasternum ist grob und weitläufig punktiert, auch das Abdomen ist mit kräftigen, weitläufigen Punkten bedeckt, die je ein sehr feines, dünnes, anliegendes Haar tragen. Das Analsegment ist ohne grubenförmigen Eindruck, vollständig gerandet, die Randung vorn deutlich geschweift. Die Vorderschienen sind abweichend von *O. hispida* am Ende aussen ausgeschnitten. Die Vordertarsen sind beim ♂ im ersten Glied scharf dreieckig nach aussen erweitert, auf der Sohle mit sehr kurzem Kamm feiner, schräg gerichter Borsten versehen, das letzte Glied ist nicht asymmetrisch, dreimal so lang wie breit. An den sehr schlanken Hintertarsen ist Glied 1 = 4.

L. 7·5—8·3 mm.; Br. 3·4—3·7 mm.

Loc. Astove Island, 1907 (H. P. Thomasset). Ins. Pamanzi bei Mayotte (Ch. Alluaud, 1897). Ins. Patta an der Küste von Brit. Ostafrika, 19. ii. 1903 (Voeltzkow). Ostafrika: Mhonda (Methner leg.); Ugogo (v. Beringe leg.); Mikasse Bezirk: Morogoro (W. Janensch leg.).

Das eine Exemplar meiner Sammlung von Pamanzi und ein anderes von der Insel Astove weichen von den Festlandstieren und von der dem Festlande direkt vorgelagerten Insel Patta

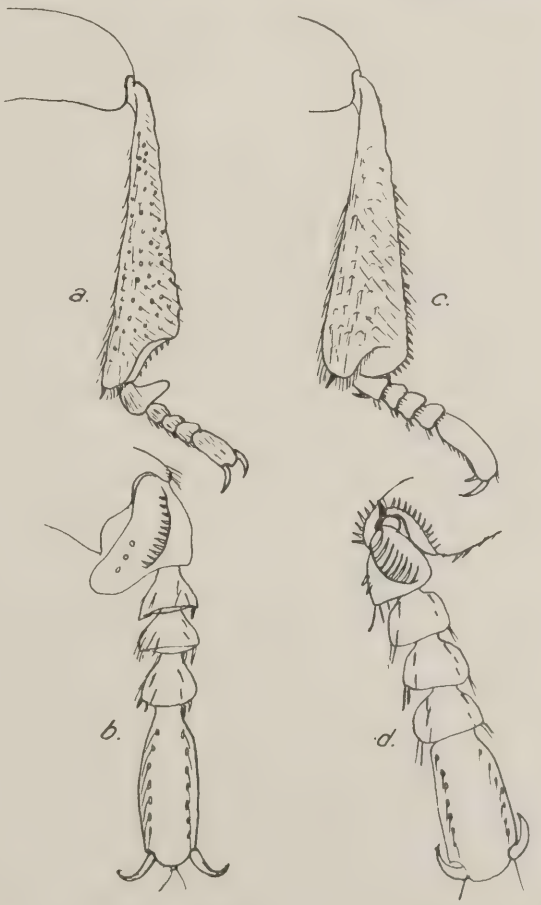


Fig. 4. Genus *Opatropis*: *a*, Vorderbein von *Opatropis blairi* ♂; *b*, Vordertarse derselben Art von der Sohlenseite gesehen; *c*, Vorderbein von *Opatropis hispida* ♂; *d*, Vordertarse derselben Art von der Sohlenseite gesehen; *a* und *c* × 25, *b* und *d* × 72.

in der Beborstung etwas ab, die Börstchen sind kürzer und dicker, die Tiere selbst etwas breiter. Leider besitze ich von dieser Form kein ♂, aber Herr Blair, der unsere Art ebenfalls unter Händen hatte, schreibt mir schon 1914, das ein ♂ von Astove die charakteristische Tarsenbildung der ♂ habe. Ich betrachte daher, trotz der Abweichungen, beide Formen als identisch.

Unsere Art unterscheidet sich von der gemeinen *O. hispida* durch die kürzere Behaarung und die Beinbildung. Bei *hispidum* sind die Vorderschienen in beiden Geschlechtern einfach dreieckig verbreitert, ein Ausschnitt aussen am Ende, wie sie unsere Art zeigt, fehlt, ausserdem ist das erste Tarsenglied ganz anders gebildet, beim ♂ von *blairi* im ersten Glied stark dreieckig verbreitert. Bei *hispidum* dagegen sind Vorder- und Mitteltarsen beim ♂ im ersten Glied mit einem rückwärts gerichteten Kamm steifer Borsten versehen, das letzte Glied der Vordertarsen ist bei *hispidum* breiter, flacher und etwas asymmetrisch, d. h. nach aussen leicht, parallelseitig erweitert, ferner hat das Analsegment des ♂ eine deutliche, flache Grube.

Reitter hat die Gattung *Opatropis* von *Gonocephalum* allein durch die Skulptur des Halsschildes, der punktiert, nicht gekörnt ist, geschieden. Die Auszeichnung an dem ersten Tarsenglied der ♂ zeigt aber einen weiteren scharfen Unterschied.

Ich nenne diese Art zu Ehren des Herrn K. G. Blair vom britischen Museum, der meine Arbeiten stets in selbstloser, oft zeitraubender Weise förderte.

Plesioderes, Muls.

Muls. und Rey, Mém. Ac. Lyon, 1860, p. 34; Op. Ent. IX. 1859, p. 126.

Syn. *Epeurycaulus* Kolbe, Abh. Senckenb. Ges. XXII. 1902, p. 579.

Der Name dieser Gattung, die vom Autor als Untergattung von *Caedius* aufgefasst wurde, ist von mir in meinem Katalog leider übersehen worden.

Kolbe hat, vermutlich veranlasst durch Fairmaire, der eine Art: *levassorii* zur Gattung *Eurycaulus* stellt, seine neue Gattung *Epeurycaulus* mit *Eurycaulus* verglichen und gute Unterschiede festgestellt. Das kann nicht wundernehmen, denn beide sind weit voneinander entfernt. *Eurycaulus* gehört zur Gruppe der Sclerinen mit vollständigen, *Epeurycaulus* zu den *Opatrinen* mit verkürzten Epipleuren. Der Verfasser hat die nahe Verwandtschaft seiner Gattung mit der in Afrika, Asien, Australien verbreiteten Gattung *Caedius* verkannt (ferner mit *Cyptus* = *Adavius*), sonst wäre ihm wohl kaum entgangen, dass Mulsant seine beiden Arten schon beschrieben, und für sie auch schon eine eigene Untergattung von *Caedius* aufgestellt hat. Auf Mulsant haben wir zurückzugehen.

Mulsant hat von der Gattung *Caedius* eine Gruppe abgeteilt und mit dem Namen *Plesioderes* belegt, die sich von *Caedius* s. str. besonders durch nicht bewimperten Seitenrand des Körpers unterscheidet. Mir scheint dieses Merkmal wichtig genug, *Plesioderes* als eigene Gattung anzuerkennen, zumal die im männlichen Geschlecht innen gezähnten Vorderschienen ein weiteres gutes Kriterium bilden. Im übrigen sind *Caedius*, *Adavius* (= *Cyptus*), ferner *Brachyidium* (= *Cnemodasus* Geb.) in ihrem gegenwärtigen Umfang nicht zu trennen. Es kann hier nicht meine Aufgabe sein, auf die verwickelte Synonymie dieser Gattungen einzugehen, umsoweniger, als die sehr zahlreichen neuen Arten, welche

von diesen Gattungen in den Sammlungen verbreitet sind, doch eine baldige gründliche Revision nötig machen. Ich muss mich hier auf die beiden Arten der Inselgruppen beschränken.

9. *Plesioderes madagascariensis*, Muls.

(Tafel **23**, Fig. 20; Textfig. 5.)

Opusc. Ent. x. 1859, p. 129; Mém. Acad. Lyon, x. 1860, p. 37.

Syn. *Epeurycaulus aldabricus* Kolbe, Abh. Senckenb. Ges. xxii. 1902, p. 579.

Mulsant's Grössenangaben sind bei dieser und der folgenden Art etwas zu gering. Da eine sorgfältige Beschreibung vorliegt, eine 2. ebenfalls recht brauchbare von Kolbe, so verzichte ich auf eine Neubeschreibung. Kolbe unterscheidet die Geschlechter nicht (unter seinen 7 Exemplaren befinden sich 2 ♂) und Mulsant beschreibt das einzige ihm vorliegende ♀ als ♂. Die Bildung der Vorderschienen ist bei unserer Art im männlichen Geschlecht sehr charakteristisch. Ich gebe hier eine Abbildung der Vorderschiene. Es findet sich eben

Fig. 5. *Plesioderes madagascariensis*: *a*, Vorderbein des Männchens; *b*, Mittelschiene des Männchens; *c*, Vorderschiene des Weibchens; × 40.

unterhalb des ersten Drittels an der Innenseite, vorn ein dreieckiger, stumpfer, manchmal sogar etwas rundlicher Zahn, darunter eine lange Ausbuchtung, die vor dem Ende durch einen meist fingerförmigen, weit nach hinten gedrückten Zahn begrenzt ist, der wegen seiner Lage am besten schräg von innen zu betrachten ist. Zuweilen (1 Ex. von den Aldabra-Inseln [Voeltzkow]) ist die Ausbuchtung selbst mit 2 Zähnchen, die nach hinten gerichtet sind, versehen. Ein anderes Exemplar, das ich ebenfalls für eine individuelle Variation halte, ist glänzend schwarz (die meisten Tiere sind mattschwarz oder etwas schmutzig grau) und hat fast abgeschliffene Körner auf den Decken, ist aber nicht alt und abgerieben, da die feine Behaarung noch recht deutlich ist.

Loc. Madagaskar (nach Mulsant). Aldabra-Inseln: iv.—v. 1895 (Voeltzkow); x. 1908 (Fryer); Picard Isl., i. 1909 (Fryer). Amiranten: Eagle Isl., 17. x. 1905 (Gardiner); Desroches Isl. (Gardiner, 1905). Seychellen: Île aux Récifs, 1908; Long Island, vii. 1908.

Mir liegen 30 Exemplare vor.

10. *Plesioderes coriaceus*, Muls. (Textfig. 6).

Opusc. Ent. x. 1859, p. 135; Mém. Acad. Lyon, x. 1860, p. 43.

Syn. *Epeurycaulus burbonicus* Kolbe, Abh. Senckenb. Ges. xxii. 1902, p. 580.

Diese Art ist auf den Seychellen und den benachbarten Inselgruppen nicht gefunden worden. Aber aus synonymisch-systematischen Gründen sind einige Bemerkungen über diese Art am Platze:

Sie ist etwas grösser als die vorige, feiner skulptiert. Der scharf ausgeprägte Unterschied zwischen beiden findet sich an den Vorderschienen der ♂. Diese haben ebenfalls einen langen Ausschnitt an der Innenseite, aber am Ende dieses Ausschnitts nicht einen fingerartigen, nach hinten gerichteten Zahn, sondern einen in derselben Ebene liegenden stumpfen oder verrundeten, beim ♀ haben dieselben Schienen nicht eine rundliche starke Erweiterung, unter welcher sich eine Einschnürung befindet, sondern nur eine ganz leichte, die der Schiene aufgesetzt ist, so dass darunter sich keine Einschnürung befindet. Mulsant beschreibt beide Geschlechter so gut, dass es nicht schwer ist Kolbe's Art in seiner wieder zu erkennen.

Fig. 6. *Plesioderes coriaceus*, Vorderschiene des Männchens, × 40.

Loc. Réunion, Mauritius, nach Mulsant auch Cap.

Eine 3. Art, die sich von der letzten durch stark und scharf längsgestrichelte Halsschildseiten unterscheidet, auch etwas andere Schienen hat, liegt mir nur in einem weiblichen Stück von der Insel Europa im Kanal von Mozambique vor. Ich halte es nicht für richtig, diese Art ohne Kenntnis des ♂ zu beschreiben.

Epeurycaulus (*Eurycaulus*) *levassorii* Fairm. ist mir leider unbekannt geblieben, ich kann daher über die Stellung dieser Art keine Auskunft geben, sicher aber gehört sie nicht zu *Eurycaulus*, was schon Kolbe feststellt (auch ihm war die Art unbekannt), aber auch ebensowenig zu *Plesioderes* (= *Epeurycaulus*, wozu sie Kolbe bringt). Das kompresse letzte Tarsenglied, die gerippten und alternierend höheren Zwischenräume der Decken, besonders aber die bewimperten Körperseiten verbieten eine Vereinigung mit dieser Gattung. Chatanay, der die Tenebrioniden der Comoren bearbeitete, führt sie lediglich als dort heimische Art an, ohne sie einer näheren Besprechung zu würdigen.

Subfam. **Crypticinae**.

Microcrypticus, Geb.

Eine ausführliche Beschreibung der Gattung *Microcrypticus* findet sich im Arch. f. Naturg. lxxxvi, 1920, A 6, p. 7.

11. *Microcrypticus variegatus*, Kl.

Diaperis variegatus Kl., Ins. Madag. 1833, p. 181, t. 4, f. 5.

Diaperis signatus Kl., *loc. cit.*, Nachtrag.

Platydema variipenne Gemm., Col. Hefte, vi. 1870, p. 122.

Vorliegende Art ist mit Unrecht zu *Platydema* gestellt worden. Ihr Name kollidiert also nicht mit *Platydema variegatum* Cast. und Brll. (1831). Daher war eine Namensänderung, die Klug im Nachtrag seiner Arbeit vornahm, überflüssig. Gemminger hatte diese bereits geschehene Änderung übersehen und sie bei der Abfassung seines Katalogs vorgenommen.

Micr. variegatus ist an der Zeichnung der Decken leicht kenntlich. Ihr ähnlich ist nur eine neue westafrikanische Art (*M. metallicus* Geb.), aber wesentlich kleiner, breiter, lebhafter metallisch, anders gezeichnet.

Die Art schien bisher auf Madagaskar beschränkt zu sein, nur Kolbe führt sie in "Stuhlmanns Ostafrika" auch vom See Jipe an. In meiner Sammlung befinden sich ferner Exemplare von Usambara (Nguelo) und Portug. Ostafrika (Beira, A. Bodong).

Jetzt liegt mir nur ein einzelnes Exemplar von der Insel Aldabra vor.

Loc. Aldabra: x. 1908 (Fryer).

Subfam. **Boletophaginae.**

BRADYMERUS, Perroud, Ann. Soc. Linn. Lyon, XI. 1864, p. 110.

12. *Bradymerus aspericollis*, Fairmaire.

(Tafel **23**, Fig. 14; Textfig. 7, 8.)

Boletophagus aspericollis Fairmaire, Ann. Soc. Ent. Fr. (4) VIII. 1868, p. 798. Alluaud in Grandidier, Hist. Madag. XXI. 1902, p. 449. Chatanay, Ann. Soc. Ent. Fr. LXXXII. 1913, p. 772.

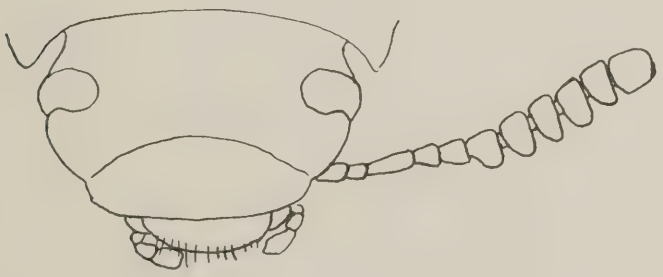


Fig. 7. *Bradymerus aspericollis*, Kopf, × 24.

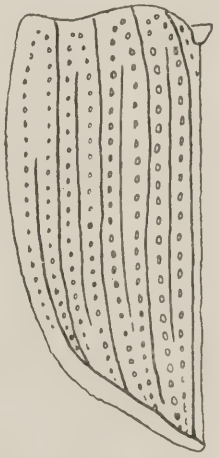


Fig. 8. *Bradymerus aspericollis*, Schema der Deckenskulptur, × 11.

Diese Art hat ausserordentliche Ähnlichkeit mit einigen Arten des indomalayischen Gebietes, besonders mit *Br. elongatus* Perty (=*javanus* Fairm.). Einige ergänzende Bemerkungen dürften daher von Wert sein, zumal Fairmaire's Beschreibung recht dürftig ist.

Kopf (s. Fig. 7) ohne Stirnfurche, aber innen an den Augen mit tiefer, schmaler Augenfurche; Augen schwach, verrundet vortretend, die Wangen von den Augen an verengt und nicht breiter als diese, Clypeus vorn ganz gerade abgestutzt, Fühler mit 6-gliedriger Keule; die Vorderecken des Pronotums stehen weiter nach innen als die Hinterecken, die Basis ist dick und vollständig gerandet, die Randlinie jederseits der Mitte mehr eingeschnitten, die Punktierung ist grob, sehr dicht und die Zwischenräume der Punkte bilden ein gleichmässiges, erhabenes, nirgends körniges Maschenwerk. Auf den Flügeldecken

(s. Fig. 8) sind sämtliche Interstitien gekielt, die Kiele sind nicht glatt, sondern fein tuberkuliert, vorn sind die alternierenden Interstitien 1, 3, 5, 7 bis zur Basis stark erhaben, die übrigen dort verkürzt ebenso an der Spitze viel kürzer als die andern, gerade und meist unverbunden auslaufenden Rippen, die 8. ist ebenfalls scharf erhaben und läuft in die Spitze der Elytren hinein, der erste Zwischenraum ist in der Mitte fast flach. Die Unterseite ist ziemlich grob, tief, aber nicht gedrängt punktiert. Nur die Mitte des Prosternums hat zusammenfliessende Punktierung, es ist hinten deutlich niedergebogen und endet in eine feine Tuberkel. Das Mentum ist der Länge nach scharf gekielt.

Von den afrikanischen Arten muss *Br. convexicollis* Fairm. aus Madagaskar am nächsten stehen, mir ist die Art unbekannt. Die Unterschiede gibt Fairmaire (Ann. Soc. Ent. Belg. XLII. 1898, p. 478) an. Die von Chatanay Bull. Soc. Ent. Fr. 1913, p. 311 aus Sansibar beschriebene Art *Br. pici* hat starke Stirnfurchen, lebhaft blaue Farbe, konisch vortretende Augen, 5-gliedrige Fühlerkeule, ganz andere Skulptur der Elytren.

Sehr nahe ist aber *Br. elongatus* Perty (=*javanus* Fairm.) verwandt, er unterscheidet sich von unserer Art durch rotbraune Färbung, etwas robustere Gestalt, schwach gekieltes Mentum, scharf vortretende Ecken des Mesosternalausschnittes, spitzen Prosternalfortsatz, schwächere Punkte der Flügeldecken, einen auch nach hinten kräftig verengten Halsschild etc.

Loc. Aldabra: xi.—xii. 1908 (Fryer); 1907 (Thomasset). Ferner bekannt von den Comoren: Mayotte; Grande Comore; Anjouan; Moheli. Madagaskar (nach Chatanay).

13. *Bradymerus scotti*, n. sp.

(Tafel **23**, Fig. 13; Textfig. 9, 10.)

Ziemlich parallel, kräftig gewölbt, in eine Kruste des Wirtspilzes eingehüllt; nach gehöriger Reinigung sind die Flügeldecken glänzend schwarzbraun, die Tarsen heller.

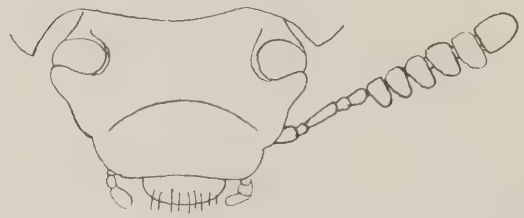


Fig. 9. *Bradymerus scotti*, Kopf, × 22.

Kopf (s. Fig. 9) ohne Stirnfurchen und ohne eigentliche Augenfurchen, am Innenrand der Augen befindet sich eine tuberkelartige Augenfalte, zwischen dieser und dem Auge eine etwas furchige Vertiefung; die Wangen sind vom Auge durch eine muldige Vertiefung getrennt, sie sind deutlich breiter als die Augen, engen diese bis zur Hälfte ein und sind ebenso lang wie die Augen hinter ihnen, der Seitenrand ist nicht geradlinig verengt, sondern zuerst schwach S-förmig eingezogen bis zur Einmündungsstelle der Clypealnaht, dort findet sich ein feiner, deutlicher Einschnitt, Clypeus gerade abgeschnitten. Die Fühler sind kurz und haben eine 6-gliedrige Keule, Glied 3 ist reichlich $1\frac{1}{2}$ mal so lang wie 4, die vorletzten Glieder sind quer trapezisch, aussen etwas länger als innen, doppelt so breit wie in der Mitte lang, sie sind deutlich gestielt, das Endglied ist so lang wie breit. Das Mentum ist quer, trapezisch, mit geradlinig verengten Seiten, oben mit scharfem, hohem Längskiel.

Der *Halsschild* ist $1\frac{3}{4}$ mal so breit wie in der Mittellinie lang, seine Seiten sind kräftig gerundet, die grösste Breite liegt hinter der Mitte, von dort ist er nach hinten schwächer, nach vorn stärker verengt, der Seitenrand ist kräftig, etwas ungleichmässig krenuliert, die

Vorderecken treten lang und spitzwinklig nach vorn, doch ist die äusserste Spitze kurz verrundet; die Mitte des Vorderrandes ist breit vorgezogen, die Basis kräftig doppelbuchtig, die Hinterecken sind rechtwinklig, die Basis selbst ist nicht gerandet, doch findet sich unmittelbar vor ihr die Spur einer Querfurche jederseits der Mitte. Die Mittellinie ist leicht furchig vertieft, es findet sich besonders hinten in der Mitte eine seichte, grubige Vertiefung. Die Wölbung reicht nicht bis zum Seitenrand, sondern dieser ist breit verflacht abgesetzt. Die Skulptur ist sehr charakteristisch und der des Kopfes ähnlich, aber gröber. Sie besteht aus groben, sehr gedrängt stehenden Punkten, deren Grund flach ist und je ein ein zentrales, mikroskopisches Körnchen trägt, die Zwischenräume sind wenig dicht, zerstreut über die Fläche und zu rundlichen Knötchen emporgezogen, bilden aber sonst recht regelmässige Maschen.

Die *Flügeldecken* (s. Fig. 10) sind an der Basis deutlich breiter als die Basis des Halsschildes, sie sind parallelseitig, stark quer gewölbt, die Schultern nicht nach vorn vorgezogen, die Basis ist doppelt, stark vorgezogen, die alternierenden Zwischenräume (3, 5, 7, 9) sind hoch und scharf gekielt, der erste ist es vorn und hinten und zwar ebenso scharf wie die andern, in der Mitte jedoch abgeflacht. Die Kiele beginnen an der Basis, der unmittelbar neben dem 7. Interstitium an der Basis beginnende 9. ist hinten vollständig, d. h. läuft bis zur Spitze durch und bildet in der Endhälfte scheinbar den Seitenrand der Elytren, dieser ist aber von oben nicht sichtbar und an der Spitze vom 9. Interstitium überwölbt, die übrigen Rippen nähern sich hier dem 9., sind aber nicht mit ihm verbunden. Der 2. u. 4. Zwischenraum sind glatt, flach, 6 und 8 haben eine Reihe feiner, etwas ungleichartiger Körnchen, ebenso der 1. in der Mitte, die Kiele sind scharf aber nicht ganz glatt, sondern bei starker Vergrösserung etwas krenuliert.

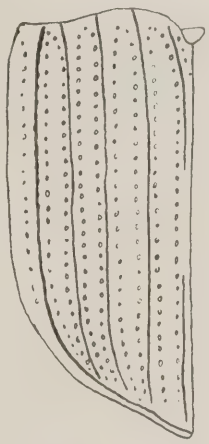


Fig. 10. *Bradymerus scotti*, Schema der Deckenskulptur, × 10.

Die glänzende *Unterseite* ist ziemlich grob, dicht und tief punktiert; das Prosternum ist sanft niedergebogen und am Ende mit wenig deutlicher Tuberkel versehen, das Mesosternum ist nicht sehr tief eingedrückt, seine Ecken sind verrundet; alle Schienen sind aussen scharf, der ganzen Länge nach gekielt, an den Hintertarsen ist Glied 4 etwas länger als der Rest.

L. 6·4—8·5 mm.; Br. 3—4·8 mm.

Unter den westlichen Arten ist nur eine verwandte, nämlich *Br. aspericollis* Fairm., unsere Art unterscheidet sich von ihr durch den gekörnten Halsschild und die ganz andere Rippenbildung der Flügeldecken. In beiden Merkmalen stimmt unsere Art mit *Br. crenulicollis* Fairm. aus dem Malay. Archipel überein, von dem sie sich aber leicht durch schmaleren Halsschild, geringere Grösse und nicht zahnartig vortretende Wangen unterscheidet.

Ich benenne die Art zu Ehren ihres Entdeckers, dem es mit grossen Mühen geglückt ist, nicht nur fast alle bekannten Arten der Seychellen und benachbarten Inseln aufzufinden, sondern der auch viele neue Arten von Tenebrioniden mitbrachte und dadurch wertvolles Material der tiergeographisch so interessanten Inseln lieferte.

14 Expl. wurden von der Expedition mitgebracht.

Loc. Seychellen. Mahé: nahe dem Morne Blanc, ca. 1000 Fuss hoch, xi. 1908, und Cascade Estate, 800—1000 Fuss, xii. 1908—i. 1909.

14. *Bradymerus seychellensis*, n. sp.

(Tafel **23**, Fig. 12.)*

Ziemlich robust, stark gewölbt, schwarz, fast matt, Fühler und Tarsen braun. *Kopf* ohne Stirnfurchen, aber mit starken und tiefen, vorn feineren Augenfurchen, die hinten sich vom Auge entfernen und von oben gesehen in die Schläfen in einer Entfernung einmünden, die gleich dem Längsdurchmesser der Augen ist. Die Clypealsutur ist kräftig eingeschnitten, verliert sich aber in den Seitenflügeln ganz; die Augen sind schwach gerundet und von den Wangen nicht bis zur Hälfte durchsetzt, die Wangen sind schmaler als die Augen und treffen in einem so stumpfen Winkel auf die Augen, dass der Kopf von den Augen an verengt erscheint, die Seiten haben keinen feinen Einschnitt, die Vorderecken des Clypeus sind breit verrundet. Die Punktierung ist mässig fein, dicht gedrängt. Die sehr kurzen Fühler haben eine nur 5-gliedrige Keule, Glied 7 ist schwach quer, das 10. fast doppelt so breit wie lang, das 11. so lang wie breit. Das Mentum ist trapezisch, der Länge nach gekielt, die Mandibeln sind gegen die Spitze schwach gefurcht, stumpf zweispitzig.

Der *Halsschild* ist 1½ mal so breit wie lang, in der Längs- und Querrichtung sehr stark gewölbt, die Wölbung reicht bis zum Seitenrand, der nur hinten schmal abgesetzt ist, die Seiten sind stark und gleichmässig gerundet, die grösste Breite liegt in der Mitte, dahinter sind die Seiten nicht eingezogen, die Vorderecken treten spitzwinklig nach vorn, die Mitte des Vorderrandes ist gerade, die Basis mässig stark doppelbuchtig, die Randlinie der Basis ist vollständig, in der Mitte verbreitert, kräftig eingedrückt, aber nicht eingeschnitten, die Seitenrandkante ist sehr schwach unduliert, ein mittlerer Längseindruck fehlt auf dem Pronotum. Die Punktierung ist sehr dicht, nicht sehr fein, jeder Punkt trägt am Grunde ein mikroskopisch feines, äusserst kurzes Härchen.

Die *Flügeldecken* sind an der Basis deutlich breiter als das Pronotum, die Schultern ragen schwach gerundet nach vorn, die Seiten sind nicht parallel, sondern gehen deutlich nach hinten auseinander. Die sehr charakteristische Skulptur tritt erst nach gehöriger Reinigung von den anhaftenden Teilen des Wirtspitzes hervor. Die inneren Zwischenräume sind flach, die äusseren deutlich konvex, der 5. u. 7. sind fein rippenförmig, der erste Streifen ist fast glatt, nur am Absturz findet sich eine kurze Reihe primärer Körnchen. Alle andern Interstitien sind sehr fein und dicht gekörnt, jedes Körnchen ist mit einem sehr kurzen, mikroskopisch feinen Härchen versehen, ausser diesen sekundären Körnern tragen die Interstitien vom 3. an (das zweite nur ganz vorn) eine regelmässige Reihe nicht sehr dichter runder Körner erster Grösse, nur beim 5. u. 7. sind die Körner gedrängt, wodurch die Rippen entstehen. Die Punktreihen bestehen aus ziemlich groben, sehr tief eingestochenen, runden Punkten, die nur undeutlich durch vertiefte Linien verbunden sind.

Die *Unterseite* ist glänzend, ziemlich grob und dicht, tief punktiert, die Punkte tragen je ein feines, gelbes, ziemlich aufrechtes Härchen, der Prosternalfortsatz ist ganz nieder-

* Dieses Tier ist verzeichnet; der Umriss ist parallelseitig, nicht oval.

gebogen, am Ende ohne Tuberkel, aber dort nicht sehr deutlich stark gerandet. Das Abdomen hat lange, anliegende, sparsame Haare. Beine ohne Auszeichnung, die Schienen sind stielrund, aussen ohne Kiel.

L. 7—9 mm.; Br. 2·9—3·8 mm.

Diese, von den meisten Gattungsgenossen abweichende Art, hat auf Madagaskar und den Inseln keine Verwandte, auch alle mir bekannten indomalayischen Arten weichen stark von ihr ab. Ähnlich ist nur *Br. semiasperatus* Fairm. von Neu-Pommern. Diese Ähnlichkeit ist bedingt durch die Gestalt des stark gewölbten Halsschild, durch die ungekielten Schienen, die Skulptur der Elytren. Doch sind bei dieser Art alle Interstitien mit einer Körnchenreihe versehen, der 3. ist undeutlich höher, der 5. u. 7. nicht, auch fehlt die sekundäre Granulation. Ferner unterscheidet sich Fairmaires Art durch die kräftige Körnelung des Pronotums und die stark vorspringenden Wangen.

Die grosse Ähnlichkeit dieser beiden geographisch weit voneinander beheimateten Arten ist sehr auffallend, es ist aber sehr gut möglich, dass sich in den dazwischenliegenden Inseln weitere Verwandte finden werden, zumal nur ein kleinerer Teil der artenreichen Gattung beschrieben ist.

Von dieser Art liegen mir 25 Exemplare vor.

Loc. Seychellen: Silhouette, Mahé, Félicité. "Silhouette: from marshy plateau of Mare aux Cochons and forest above, ca. 1000 feet. Mahé: Cascade Estate, about 1000 feet, and near Morne Blanc, about 1000 feet. Félicité; from forest, xii. 1908."

Eine Notiz über das Vorkommen in Pilzen findet sich nicht.

15. *Bradymerus hispidus*, n. sp.

Klein, parallel, ziemlich kräftig gewölbt, einem kleinen *Gonocephalum* sehr ähnlich, schwarz, nach gehöriger Reinigung glänzend, Fühlerwurzel, Taster, Tarsen braunrot. Der *Kopf* hat keine Stirnfurchen, aber eine kräftige, tiefe, sich hinten verbreiternde und sich vom Auge entfernende Augenfurche, eine Augenfalte oder -tuberkel fehlt, die Augen werden vom Canthus nicht bis zur Mitte geteilt, er trifft im Winkel auf das Auge und ist gut von ihm abgesetzt, die Seiten des Kopfes mit feinem Einschnitt, die Clypealsutur ist gut ausgebildet, die Punktierung ist sehr dicht, ziemlich grob, jeder Punkt mit einem zentralen, aufrechten Börstchen. Die Fühler reichen kaum bis zur Mitte des Halsschildes, sie haben eine 5-gliedrige Keule, auch Glied 6 ist schwach quer kugelig, die vorletzten Glieder sind fast 3 mal so lang wie breit. Der Unterkopf gleicht dem der vorigen Art.

Der *Halsschild* ist querüber bis an den ganz schmal abgesetzten Seitenrand gewölbt, ein mittlerer Längseindruck fehlt, die grösste Breite liegt in der Mitte, die Seiten sind stark gerundet, nach vorn und hinten fast gleichmässig verengt, vor den Hinterecken nicht ausgeschweift, die Hinterecken sind scharf rechtwinklig, die Vorderecken treten spitzwinklig nach vorn vor, die Mitte des Vorderrandes ist gerade. Der Seitenrand ist kräftig krenuliert, jedes Zähnchen wird durch ein Körnchen gebildet, hart am Vorderrande befindet sich ein Querreihe von Körnchen, die Basis ist durch eine, in der Mitte breitere, eingedrückte, aber nicht eingeschnittene Linie gerandet. Die Skulptur besteht aus feinen, sehr dicht gedrängten, im Grunde flachen Punkten, deren Zwischenräume ein regelmässiges feines Netzwerk bilden, jeder Punkt mit einem zentralen, schwarzen, aufrechten Börstchen.

Diese Börstchen gleichen dem der Elytren, sie sind gegen die Spitze verdickt, die Spitze selbst ist gerade abgeschnitten.

Die *Flügeldecken* sind zylindrisch gewölbt, die Seiten fallen hoch senkrecht ab, die Randkante ist von oben nicht sichtbar. Die ganzen Decken sind mit äusserst kurzen, starren, schwach keuligen, aufstehenden Börstchen besetzt. Eigentliche Kiele fehlen, nur der 7. Zwischenraum ist hinten ziemlich scharf kielförmig und läuft bis zur Spitze durch, der 1. ist an der Basis leicht gewölbt, 3, 5, und 7 sind der ganzen Länge nach gewölbt und mit je einer Reihe mässig grober Körner besetzt, die anderen Zwischenräume sind ganz flach und dicht und sehr fein gekörnt, jedes Körnchen trägt ein Börstchen. Die Punktreihen sind kräftig, ihre Punkte rund, tief eingestochen.

Die *Unterseite* ist blank, das Prosternum vorn und hinten gesenkt, kräftig punktiert, die Mittelbrust ist rundlich, tief eingedrückt, das Abdomen ist grob und nicht dicht punktiert, nur das letzte Segment wesentlich dichter und feiner. Die Punkte sind rauh, d. h. haben einen scharfen Vorder- und flachen Hinterrand und tragen je ein sehr kurzes, unauffälliges, etwas abstehendes Härchen. Die Beine sind lang, die Mittelschienen vor dem Ende deutlich eingeschnürt, alle Tibien sind stielrund, ungekielt, haben aber an der Aussenseite zahlreiche kleine, körnige oder knotige Erhabenheiten. Die ganzen Beine haben wie die Oberseite kurze Börstchen.

L. 4·2—5·6 mm.; Br. 1·8—2·2 mm.

2 Exemplare.

Loc. Seychellen. Mahé: Mare aux Cochons district, 26. i.—2. ii. 1909. Silhouette: Mare aux Cochons, ix. 1908.

Diese Art, eine der kleinsten der Gattung, ist nur mit der vorigen verwandt, hat ebenfalls einen stark gewölbten Halsschild, fast zylindrisch gewölbten Hinterkörper, ungekielte Schienen, eine nur 5-gliedrige Fühlerkeule, beide Arten stehen einigen aus dem papuanischen Gebiet (z. B. *semiasperatus, trobiandensis*) am nächsten. Aus dem indomalayischen Gebiet liegt mir keine näher verwandte Art vor, scheint auch zu fehlen, da die grösseren deutschen und holländischen Sammlungen kein inbetracht kommendes Material besitzen. *Br. hispidus* unterscheidet sich von *seychellensis* durch geringe Grösse, dicht, aber kurz beborsteten Körper, ganz andere Deckenskulptur, und Schienen, welche durch feine, knotige Erhabenheiten rauh sind.

Die 4 aus unserm Faunengebiet bekannten Arten lassen sich wie folgt unterscheiden.

1. Schienen aussen gekielt, Fühlerkeule 6-gliedrig, Körper flacher, der Seitenrand der Decken von oben sichtbar ..... 2.

Schienen ungekielt, Fühlerkeule 5-gliedrig, der Seitenrand der Decken von oben nicht sichtbar, Hinterkörper zylindrisch ..... 3.

2. Die Wangen springen eckig vor und sind breiter als die Augen, Halsschild ohne Mittelfurche, mit scharfen Körnern, nur die abwechselnden Zwischenräume hoch gekielt, Beine schwarz ..... *scotti* Geb.

Die Wangen springen nicht vor, sind verrundet und schmaler als die Augen, Halsschild mit starkem Längseindruck, ungekörnt, alle Zwischenräume vom 3. an gekielt, Schienen und Füsse rot ..... *aspericollis* Fairm.

3. 7—9 mm. gross, Körper schwach beborstet, Abdomen mit langen, anliegenden, sparsamen Haaren bekleidet, alle Zwischenräume vom 3. an mit einer Körnerreihe, 5 und 7 mit erhabenem, gekerbtem Kiel ..... *seychellensis* Geb.

4—5½ mm. gross, Körper dicht und stark, aber kurz beborstet, Abdomen mit abstehenden, sehr kurzen, sparsamen Härchen bekleidet, nur die abwechselnden Zwischenräume mit einer Körnerreihe, 5 und 7 ohne Kiel..... *hispidus* Geb.

Subfam. **Rhipidandrinae**.

Diese Unterfamilie, die vielleicht als Verbindungsglied zwischen den Ciiden und Tenebrioniden eine eigene Familie zu bilden hat, ist in allen Weltteilen verbreitet. Bisher sind aber nur wenig Arten bekannt, die einander sehr nahe stehen und nach den vorliegenden Beschreibungen allein nicht sicher erkannt werden können. Barber und Schwarz, vor ihnen Sharp, Arrow haben über die Stellung der hierher gehörenden Gattungen ausführlich berichtet, sind aber sehr verschiedener Meinung. Ich möchte mich Barber und Schwarz anschliessen, wenigstens vorläufig und die Rhipidandrinen als eigene Unterfamilie der Tenebrioniden auffassen.

Barber hat Proc. Ent. Soc. Wash. xv. 1913, pp. 188—193 eine vollständige Bibliographie über unsere Gruppe gegeben und sie *op. cit.* xvi. 1914, pp. 175—177 ergänzt. Ich kann also meinerseits auf Litteraturangaben verzichten, füge aber als weitere Gattung hinzu: *Bolitopertha* Geb., die mit *Cherostus* zusammenfällt. Nach Barber sollte allerdings diese Gattung nicht *Cherostus*, sondern *Xyloborus* Motsch. genannt werden. Ferner ist es ihm und mir zweifelhaft, ob nicht beide zusammenfallen mit *Rhipidandrus* = *Eutomus*. Jedenfalls sind die Unterschiede, die angegeben werden, nicht von generischem Wert. Doch will ich, da ich hier nicht monographisch zu arbeiten habe, zu dieser Frage gegenwärtig nicht Stellung nehmen. Aber gegen die Umwandlung von *Cherostus* in *Xyloborus* muss ich mich entschieden wenden. Der Name *Xyloborus* führt wegen *Xyleborus* leicht zu Verwechslungen und hat tatsächlich mehrfach dazu geführt, wird doch die Art *crenipennis* von Hagedorn und Kleine noch jetzt in den Ipiden-Katalogen aufgezählt. Diese Namensähnlichkeit ist natürlich kein Grund, den Namen zu verwerfen, es wäre aber wirklich zu begrüssen, wenn er schwinden würde. Die Möglichkeit, ihn zu unterdrücken, ist uns dadurch gegeben, dass er nur nomen nudum ist. Motschulsky nimmt den alten Dejeanschen Gattungsnamen *Xyloborus*, der nur eine unbeschriebene Art führt, auf für eine indische Art *crenipennis*, ohne die Gattung zu charakterisieren. Ich stehe auf dem Standpunkt, dass Gattungsnamen nicht dadurch Gültigkeit erlangen, dass ihnen der Name einer beschriebenen Art hinzugefügt wird. Alle Systemeinheiten: Klasse, Ordnung, Familie, Unterfamilie, Gattung, Art müssen durch Herausstellen bestimmter Merkmale begründet werden. Das trifft in unserm Falle nicht zu, daher erkenne ich dem Namen *Xyloborus* keine Prioritätsberechtigung zu. Es ist also zu zitieren:

Cherostus, Waterhouse, Ann. Mag. Nat. Hist. (6) xiv. 1894, p. 68.

Xyloborus Dejean, Motsch., *i. l.*
Bolitopertha Gebien, Ergebn. Exped. Kilimandj. i. 7, 1910, p. 379.

16. *Cherostus speculifrons*, n. sp. (Textfig. 11).

Ganz zylindrisch, matt schwarzbraun. *Kopf* flach gewölbt, Augen normal, fast kreisrund. Vom Rande des Epistoms zieht sich ein langer Spiegelfleck zwischen die Augen, $\frac{1}{3}$ der Stirnbreite einnehmend; er reicht hinten meistens zu einer Höhe mit dem Hinterrand der Augen und ist selten kürzer. Der ganze übrige Raum ist mit einem gleichmässigen Maschenwerk erhabener Linien ausgefüllt. Der Spiegelfleck hat zuweilen vorn an den Seiten und unmittelbar am Rande des Epistoms einige Pünktchen. Der Epistomrand ist scharf, die Oberlippe etwas untergebogen; Wangen fehlen, doch ist der Rand des Kopfes sehr scharfkantig und neben dem Spiegelfleck vorn etwas flachgedrückt. Die Fühler sind mit einer langen, geblätterten Keule versehen, die stark nach vorn geknickt ist: mindestens rechtwinklig, meistens spitz. Glied 1 ist dick, 2 rundlich, 3 viel länger als breit, dünner als 2, an der Spitze am dicksten, 4 umgekehrt nach der Spitze verjüngt, dreieckig, 5 ist an der Aussenkante am längsten, vorn scharf nach unten abgeschrägt und ermöglicht dadurch die starke Knickung der Fühler; von 6 an sind die Glieder innen stark ausgezogen, zuerst spitzwinklig, die vorletzten breiter, das letzte ist fast kreisrund und ist im 10. etwas eingebettet. Die Seiten des Unterkopfes zwischen Auge und Mundteilen bilden eine breite, blanke, stark erhabene, oben eingedrückte Fläche mit scharfer, überstehender Kante, durch welche eine Fühlerfurche gebildet wird, in der die Fühler in der Ruhelage eingeschlagen sind. Das Kinn ist trapezisch, länger als breit, in der Mitte schwach erhaben, Endglied der Maxillarpalpen lang spindelförmig, Mandibeln am Ende scharf zugespitzt und geteilt. Die ganzen Mundteile liegen wie bei den meisten Boletophagiden erhaben.

Fig. 11. *Cherostus speculifrons*, Fühler, × ca 60.

Das *Pronotum* fällt an den Seiten senkrecht ab, doch ist die Seitenrandkante von oben gerade noch sichtbar. Von der Seite gesehen erscheint die gerade Mittellinie $1\frac{1}{2}$ mal so lang wie die Randkante. Die Vorderecken sind breit, die Hinterecken kurz verrundet. Die Skulptur der Oberfläche ist wie die des Kopfes ein gleichmässiges Netzwerk von fein erhabenen Linien. Von oben gesehen ist der Vorderrand halbkreisförmig vorgezogen. Das Schildchen bildet ein gleichseitiges Dreieck.

Die Basis der *Flügeldecken* ist scharf gekantet, die Seiten fallen senkrecht ab, die Randkante ist nur ganz vorn von oben sichtbar. Es sind 9 scharfe Rippen vorhanden und eine 10., schwächere, ganz vorn neben der ganz verrundeten Randkante der Schultern; an dieser Stelle ist die 9. Rippe weit von der Schulter entfernt. Die Rippen sind schmal, vorn fast glatt, scharf erhaben, hinten fein krenuliert. Ihre Anordnung ist folgende: 1 läuft durch bis zur Spitze und verbindet sich mit der Randkante, 3 nähert sich dicht vor der Spitze 7, etwas kürzer, aber gleichlang, sind 4, 5, 6, 8; 2 hält schon oben am Absturz auf. Die Zwischenräume sind flach glatt, durch niedrige, ziemlich regelmässige Querrippchen gegittert.

Das *Prosternum* fällt vorn und hinten senkrecht ab und ist zwischen den Hüften sehr schmal; das Mesosternum ist vorn hoch senkrecht, aber nicht ausgeschnitten, Metasternum und Abdomen sind dicht und stark punktiert, das Analsegment hat am Grunde

einen starken, queren Eindruck. Die Beine sind kurz, die Schienen dick, die vorderen lang dreieckig und mit einer, die hinteren beiden Paare mit 2 fein krenulierten Aussenkanten. Die vorderen sind vorn am Ende eingedrückt und ausgeschnitten, die Aussenecke ist ziemlich scharf rechtwinklig, die Mittel- und Hinterschienen beim ♂ mit ausgezogener, dornförmiger Endecke, beim ♀ mit stumpferer und hier am unteren Ende fein bedornt. An allen Füssen sind nur 4 Glieder deutlich.

L. 2·3—2·8 mm.

Loc. Seychellen. Long Island, 12—22. vii. 1908, 86 Exemplare. Silhouette: nahe Mt. Pot-à-eau, über 1000′, viii. 1908, 2 Exemplare; ferner 6 Exemplare "bred together with Anobiid beetles and a small Ichneumonid (*Thersilochus evanescens*, Morley) from fungus found in the highest damp forest, about 2000 feet, 29. vii. 1908 (Scott)."

Die Art ist aufs nächste mit *Ch. nudus* Geb. von Borneo verwandt, aber schwarzbraun statt rotbraun, der Spiegelfleck der Stirn ist lang gestreckt, bei *nudus* klein, etwas quer; ferner ist vorn auf den Decken, neben dem Seitenrand an der Schulter ein kurzer, niedriger 10. Kiel vorhanden, welcher der verwandten Art fehlt. Wie es mit *Cherostus crenipennis* Motsch. steht, weiss ich nicht, mir liegen von dieser Art keine authentischen Stücke vor, und die Beschreibungen von Motschulsky und Arrow geben keinen sicheren Aufschluss; die Farbe ist jedenfalls ganz anders, doch in der Bildung des Stirnfleckens scheinen beide überein zu stimmen. Viel weiter entfernt steht *Ch.* (*Bolitopertha*) 9-*costata* Geb., ist viel grösser, schlanker, hat Augenkiel, nur glänzendes, punktiertes Epistom, auch ist die Beinbildung eine etwas andere.

Subfam. **Dysantinae**.

Diese Unterfamilie wird in einer grossen Arbeit über die orientalischen Tenebrioniden neu aufgestellt. Sie steht den Boletophaginen am nächsten und unterscheidet sich hauptsächlich durch den Mangel einer Gelenkhaut zwischen den letzten Abdominalsegmenten. In diese Unterfamilie gehören ausser der nachstehend beschriebenen Gattung noch: *Dysantes, Calymmus, Ozolais, Mychestes, Orcopagia, Ilyxerus* und eine neue Gattung *Phloeopsidius*, die auf *Boletophagus flexuosus* Sol. von Chile zu gründen ist.

Cylindrosia, nov. gen.

Geflügelt, langgestreckt, zylindrisch, ungehörnt.

Kopf (s. Fig. 12) senkrecht, von oben schwach oder nicht sichtbar, da er unter dem bogig vorgezogenen Rand des Pronotums verborgen ist. Er ist klein, hat eine stark, fast buckelig gewölbte Stirn, die von den Augen durch eine kurze, tiefe Augenfurche abgesetzt ist. Die Augen quellen stark vor, sind aber klein und kaum von den Wangen eingeschnürt, diese sind schmäler als die Augen. Die Quernaht ist tief gerade, das Epistom ist kurz, schwach ausgebuchtet. Die Oberlippe ist gross, frei, zwischen ihr und dem Clypeus ist keine Gelenkhaut

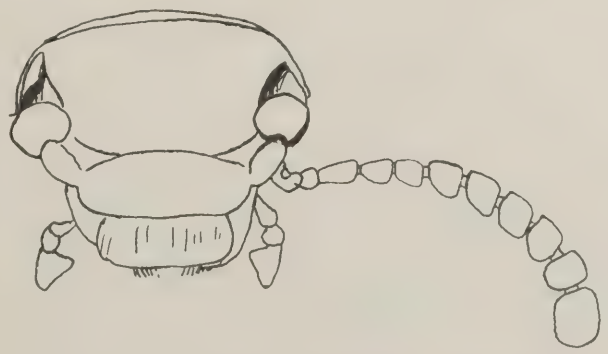


Fig. 12. *Cylindrosia foveifrons*, Kopf, × 32.

sichtbar. Die Fühler sind ziemlich schlank und reichen fast bis zur Basis des Pronotums, sie sind 11-gliedrig, Glied 3 ist länger als 4, gegen das Ende werden die Fühler allmählich dicker, ohne eine eigentliche Keule abzusetzen. Die Mandibeln sind am Grunde sehr dick. Die Unterseite des Kopfes liegt in 2 Ebenen, die Mundteile liegen etwas höher als die Kehle, hinter dem Mentum stürzt der Unterkopf nämlich kurz und scharf ab, aber die Mundteile liegen nicht erhöht über den Seiten des Kopfes wie bei *Byrsax*, *Atasthalus* etc., eine Fühlerfurche fehlt also. Zwischen Augen und Maxillarausschnitt befindet sich ein sehr breiter Zwischenraum. Das Kinn ist kräftig, einfach gewölbt, die Seiten sind trapezisch verengt, das Labium ist frei, gross; das Endglied der Maxillarpalpen ist sehr breit dreieckig, die Mandibeln sind aussen ungefurcht.

Das *Pronotum* hat weder Erhabenheiten noch Hörner, es ist in der Längsrichtung mässig stark, querüber zylindrisch gewölbt, die Seitenrandkante ist vollständig und scharf. Der Vorderrand ist in starkem Bogen vorgezogen, alle Ecken sind scharf, die Mittellinie ist viel länger als die Seitenrandkante, die Basis des Pronotums und der Decken ist gerade, das Schildchen dreieckig, etwas quer.

Die *Flügeldecken* haben eine scharfkantige Basis und gut ausgebildete Schultern; es sind Punktstreifen vorhanden, die Zwischenräume sind granuliert, die Epipleuren sind sehr schmal, am vorletzten Segment ausgebuchtet, gleich darauf geschwunden.

Die *Unterseite* ist nackt, das Prosternum ist vorn und hinten senkrecht niedergedrückt, vor den Hüften, die vorn frei liegen und vorragen, stark verkürzt, es ist in der Mittellinie (also zwischen den Hüften hindurch gemessen) stark verkürzt, nicht ganz halb so lang wie an der Seitenrandkante gemessen, demgemäss sind Vorder- und Hinterrand in starkem Bogen ausgeschnitten. Das Mesosternum fällt ebenfalls vorn senkrecht ab, ein Eindruck fehlt. Die Gelenkhöhlen der Vorderhüften sind geschlossen. Das Metasternum ist lang, das Abdomen hat keine sichtbare Gelenkhaut zwischen den letzten Segmenten; der Abdominalfortsatz ist lang und spitz, kräftig gerandet, der Vorderrand des letzten und vorletzten Segmentes ist querüber furchig eingedrückt. Die Beine sind mässig lang, die Schenkel kurz, im Querschnitt kreisförmig, unten nur ganz am Ende mit der Spur eines Eindrucks. Die Schienen sind längsgestrichelt, ungekielt, sie haben keine sichtbaren Enddornen. Die Tarsen sind lang, an den hinteren ist das erste Glied länger als 2 und 3 zusammen.

Von allen Gattungen, die, wie oben erwähnt, zu den Dysantinen zu rechnen sind, entfernt sich unsere durch verhältnismässig glatten Körper und nicht mit einem mehrgliedrigen Knopf versehene Fühler. Die andern Gattungen haben auf dem Pronotum entweder Hörner (*Calymmus* und *Dysantes*) oder starke höckerartige Vorragungen. Auch die Bildung des vorn tief und senkrecht abstürzenden Prosternums ist von Wichtigkeit. Äusserlich viel ähnlicher, wegen der lang zylindrischen Gestalt, sind die Boletophaginen-Gattungen *Dicraeosis* und *Danodema* (n. gen.) der indischen Fauna, die aber ausser durch die Gelenkhäute am Abdomen in mehreren Merkmalen abweichen, die erstere hat einen seitlich nicht gerandeten Halsschild, eingedrücktes Mesosternum und geknopfte Fühler. Die letztere unterscheidet sich durch ganz andere Bildung des Kopfes, an dem u. a. die Fühlerfurchen fehlen.

17. *Cylindrosia foveifrons*, n. sp. (Tafel **23**, Fig. 11; Textfig. 12.)

Lang zylindrisch, matt schwarz, nackt. Der *Kopf* (s. Fig. 12) ist senkrecht und hat eine stark gewölbte Stirn, die Augen sind sehr klein, rundlich, kräftig vorquellend, innen von tiefen, dreieckigen Augenfurchen begrenzt, deren Hinterkante scharfkantig ist; die Stirn ist äusserst fein, flach und undeutlich gekörnt. Die Quernaht ist tief, gerade, nicht eingeschnitten, sondern eingedrückt, das Epistom ist etwas blank, punktiert, es ist vorn in sehr flachem Bogen ausgerandet. Die Fühler sind schlank, zur Spitze allmählich verdickt, Glied 3 ist zylindrisch, $1\frac{1}{2}$ mal so lang wie breit, 4 und 5 sind so breit wie lang, von 6 an werden die Glieder allmählich stärker quer, sie sitzen mit kurzen Stielchen aufeinander, sind oben scharfkantig begrenzt, hinten gerade, vorn etwas schmäler, das vorletzte ist kaum $1\frac{1}{2}$ mal so breit wie lang, das letzte fast kugelig.

Der *Halsschild* ist hoch gewölbt, der Vorderrand in starkem Bogen vorgezogen, er verdeckt, von oben gesehen, den Kopf, die mittlere Längslinie ist viel länger als die gerade, scharfe Seitenrandkante. Die Seiten sind mässig stark gebogen, die Hinterecken sind stumpf, die vorderen in der Randkante scharf rechtwinklig. Die Mitte der Basis erscheint auf lange Strecke aufgebogen, da sich vor ihr eine schmale Querfurche befindet. Die Punktierung ist grob und sehr dicht, aber isoliert, nur in der Mitte vorn bilden die Zwischenräume der Punkte kurze Längsrunzeln.

Die *Flügeldecken* sind querüber so stark gewölbt, dass die Seitenrandkante von oben nirgend sichtbar ist, die Basis ist, wie die des Halsschildes ganz gerade, scharfkantig. Es sind regelmässige Streifen tief eingestochener Punkte vorhanden, die auf der Scheibe rund, an den Seiten länglich sind. Die Zwischenräume sind flach gewölbt und gleichmässig, ziemlich dicht gekörnt. Die Körner stehen in ungefähr 3 sehr unordentlichen Längsreihen, sie sind fein, blank, wie abgeschliffen, an der Spitze sind die Körner und Punkte kaum feiner.

Das *Prosternum* ist in der Mitte, von vorn nach hinten gemessen, sehr kurz, es fällt vorn und hinten steil ab, vor den Hüften findet sich eine sehr tiefe, scharfe Querfurche, die Propleuren sind so grob, aber weitläufiger punktiert als das Pronotum, das Metasternum fein, die Punktierung des Abdomens ist fein, aber nicht gedrängt. Die Epipleuren sind innen bis zum Ende der Hinterbrust scharf gerandet. Die Beine sind mässig lang, die Schienen leicht gekrümmt, aussen fein und kurz längsstrigos, die Tarsen sind ziemlich lang, an den vorderen ist das Klauenglied so lang wie die andern zusammen, an den mittleren und hinteren ist Glied $1 = 2 + 3$.

L. 5·1—5·6 mm.

Loc. 4 Exemplare von den Seychellen. Mahé: "country above Port Glaud, about 500—1000′, 5. xi. 1908"; "top of Mount Sebert, nearly 2000′"; 1906 (Thomasset).

Subfam. **Diaperinae.**

Von den Diaperinen ist nur die Gattung *Platydema* in einer Art auf den Seychellen heimisch. Es ist zu verwundern, dass die Gattung *Ceropria* nicht auf den Seychellen vorkommt, die mit zahlreichen Arten im indischen Gebiet heimisch ist und von der *C. coquereli* auf Madagaskar und die nahe verwandte *C. romandi* im ganzen tropischen Afrika gemein sind. Die erstere dieser beiden Arten ist von den Comoren bekannt, aber auf allen andern Inseln fehlt sie.

18. *Platydema inaequidens*, Fairm.

Hoplocephala inaequidens Fairm., Le Natur. II. 1880, p. 308; Ann. Soc. Ent. Fr. 1880, p. 334; Ann. Soc. Ent. Belg. 1893, p. 524; Bull. Soc. Ent. Fr. 1893, p. cccxxiv. Chat., Ann. Soc. Ent. Fr. 1913, p. 772.

Subspec. *seychellarum*, nov. (Tafel **23**, Fig. 6).

Glänzend schwarz, lang oval, Beine, der Rand des Kopfes, die ersten 3 Fühlerglieder gelbrot, die Flügeldecken mit rötlichen Flecken.

Kopf in beiden Geschlechtern mit kräftigem Eindruck auf der Stirn und asymmetrisch kurz gehörnt oder tuberkuliert. Die Grube ist zwar tief, aber hinten nicht scharfkantig begrenzt, beim ♂ spiegelblank, kaum mit der Spur einiger Pünktchen, beim ♀ dagegen deutlich punktiert. Die Stirnbreite vorn beträgt etwas mehr als die Breite eines der queren Augen. Das linke Horn, oder die linke Tuberkel (von oben gesehen) ist wesentlich grösser als das rechte, dieses ist beim ♂ mehr eine längliche, schmale Schwiele, auch das linke ist nur einfach konisch. In diesem Geschlecht hat das Epistom eine 3. konische, nicht sehr spitze Erhabenheit, die dem ♀ fehlt. Der Vorderkopf ist von oben gesehen, einfach halbkreisförmig, die Fühler sind vom 4. Gliede an schwarz, erweitert, behaart, das 3. ist fast zylindrisch, so lang wie das 4., dieses ist so breit wie lang, die folgenden sind quer, das vorletzte (ohne das Stielchen) ist fast doppelt so breit wie lang.

Der *Halsschild* ist stark quer, die Seiten sind stark heruntergebogen, doch ist der Seitenrand von oben vollständig sichtbar. Vorn sind die Seiten fast senkrecht, so dass der Vorderrand, von vorn gesehen, ungefähr—etwas abgeflacht—halbkreisförmig ist. Die Spitzenrandung ist in der Mitte leicht unterbrochen, übrigens sehr fein. Die basalen Grübchen sind undeutlich, rund, der basale Mittellappen hat einen sehr feinen, aufgebogenen Rand. Die Vorderecken sind verrundet, die hinteren ziemlich scharf stumpfwinklig, die Basis ist dort nicht deutlich vorgezogen. Die Punktierung ist kräftig, tief, nicht eng, an den Seiten etwas gröber.

Die *Flügeldecken* sind querüber stark gewölbt, die Seiten fallen hoch senkrecht ab, doch ist die Seitenrandkante von oben ganz sichtbar. Jede Decke hat 2 Flecken, vorn findet sich eine stark quere, schräge Schulterbinde, welche den Seitenrand berührt und innen schräg nach der Naht zu läuft, den ersten oder die beiden ersten Streifen freilassend. Die Binde ist vorn mehr nach innen zu, an der Hinterseite mehr nach aussen ausgebuchtet, übrigens nicht scharf begrenzt. Der Spitzenfleck ist beiden Decken gemeinschaftlich, ebenfalls schräge, er nähert sich im 6.—7. Zwischenraum der vorderen Binde stark und tritt an der Naht mehr zurück, diese geht aber nicht dunkel durch. Die Streifen sind vorn stark, hinten schwach furchig vertieft, die Punkte in ihnen sind grob, im 4. stehen ungefähr 30 Punkte, die weiter voneinander entfernt sind als ihr Durchmesser, der Nahtstreif ist hinten besonders tief eingedrückt. Die Zwischenräume sind vorn fast flach, hinten sehr stark gewölbt, äusserst fein und nicht dicht punktiert.

Das *Prosternum* ist schmal, fast wagerecht, hinten nur sehr wenig gesenkt, mit leicht prononzierter Spitze, es fällt sehr steil, fast senkrecht ab. Das Mesosternum ist scharf und breit V-förmig ausgeschnitten, die Ecken sind ganz verrundet. Das Abdomen ist kräftig punktiert, jeder Punkt mit anliegendem, goldgelben Haar versehen, die Seiten sind leicht

längsrunzlig, das Analsegment hat eine vollständige, sehr feine Randlinie, die Schenkel sind dick, anliegend, ziemlich lang behaart, auch die geraden Schienen sind behaart, mit scharfer, krenulierter Aussenkante versehen, jedes Zähnchen der Krenulierung mit Wimperhärchen, auch die Innenseite der Schienen mit kurzem Wimpersaum. Die Tarsen sind dünn, an den hinteren ist Glied 1 so lang wie 2 und 3 zusammen.

L. 3·6—4·1 mm.

Loc. In Anzahl von den Seychellen. Mahé: Cascade Estate, 800—1000′. Long Isl., vii. 1908. Silhouette: ca. 1500′, viii. 1908.

Ferner von Mahé: Mamelles (Brauer leg.) im Berliner Museum, ein ♂, das Kolbe in seiner Arbeit als *Platydema inaequidens* bezeichnete.

Mir liegen typische Exemplare von *inaequidens* nicht vor, ein ♀ von Madagaskar in meiner Sammlung (Süd-Madagaskar: Pays Androy (Nord), Alluaud leg.) ist aber sicher eine scharf geschiedene Form, und vermutlich sogar eine andere Art. Denn bei *seychellarum* haben ♂ und ♀ einen tuberkulierten Kopf, bei der Form, die ich für die echte *inaequidens* halte, ist der Kopf beim ♀ flach, ferner ist der Halsschild an den Seiten gröber punktiert, dagegen ist bei *seychellarum* die Punktierung der Deckenstreifen gröber, denn bei dem echten *inaequidens* sind im 4. Streif 36—38 Punkte vorhanden.

Var. *diluticorne*, nov.

Diese Varietät von *inaequidens* vertritt die Stammform in Ostafrika. Sie stimmt mit ihr in allen wesentlichen Teilen überein, auch hier ist die Stirn beim ♀ nicht eingedrückt und nicht tuberkuliert, aber die Fühler sind ganz hell (bei *inaequidens* nur die ersten 3 Glieder) und die Punkte der Streifen sind noch feiner, auch sind die Zwischenräume bis über die Mitte hinaus flach, und auf dem hellen Fleck sind 3 und 5 wesentlich breiter als die benachbarten, der 4. dagegen hinter dem Fleck. Bei der Stammform und bei *seychellarum* ist die Verbreiterung recht undeutlich.

Einige Exemplare beider Geschlechter von Portug. Ostafrika: Beira (A. Bodong) in meiner Sammlung.

Pl. inaequidens Fairm. mit ihren beiden oben genannten Formen bilden zusammen mit dem madegassischen *Pl. tricorne* Kl. eine besondere Gruppe in der Gattung, ausgezeichnet durch den sexuellen Dimorphismus; es findet sich beim ♂ eine asymmetrische Kopfbildung. Die ist zwar in der Gattung nicht vereinzelt, sie ist z. B. von vielen der gezeichneten orientalischen Platydemen bekannt; aber bei diesen ist in der Regel das rechte Horn grösser und ausserdem behaart, bei unseren Arten dagegen ist das linke grösser und nackt. Nur bei *Pl. asymmetricum* und *sericeum* ist die linke Kopfseite stärker entwickelt, doch unterscheiden sie sich u. a. durch die Färbung leicht. *Pl. tricorne* ist einfarbig und hat beim ♂ ein sehr langes, gebogenes linkes Horn, ferner ist die Art grösser.

Was Fairmaire und Chatanay veranlasst hat, unsere Art in die Gattung *Hoplocephala* zu stellen, weiss ich nicht.

19. *Heterophyllus atomus*, n. sp.

Sehr klein, meines Wissens die kleinste bisher bekannte Tenebrionide, kurz oval, hoch gewölbt, lackglänzend schwarz, Fühler, Beine, Mundteile gelb.

Der *Kopf* ist flach, vereinzelt, sehr deutlich punktiert, das Epistom durchaus

nicht gewulstet, die Augen sind ganz rund, von den Wangen nicht eingeengt, klein, innen von einer flachen, kurzen, aber breiten Augenfurche begrenzt. Der Vorderkopf ist dicht vor den Wangen gerade abgeschnitten, das Epistom ragt also nicht wie bei andern Arten vor, auch die Mandibeln sind klein, nicht vorgezogen. Die 11-gliedrigen Fühler haben eine stark abgesetzte Keule von 5 Gliedern. Das letzte Glied ist nicht gerade abgeschnitten, sondern wie bei 2 madegassischen Arten (*dispar* und *antennatus* Geb., *i. l.*) am Ende rundlich. Glied 1 und 2 sind dick, viel dicker als 3, 2 so lang wie 3, die folgenden 3 sind klein, rundlich, quer, 7—10 sind stark quer, 9 ungefähr 4 mal so breit wie lang, alle diese 4 mit sehr scharfer, oberer Kante, das letzte ist nicht ganz doppelt so breit wie lang. Das Mentum ist scharf gekielt, das Endglied der Palpen fast zylindrisch.

Der *Halsschild* ist stark quer, die Seiten fallen fast senkrecht ab, die Hinterecken sind sehr breit, die vorderen kurz verrundet, die Spitze ist in starkem Bogen vorgezogen, die Basis ungerandet, die Punktierung ist sehr fein und sparsam.

Die *Flügeldecken* sind hoch gewölbt, zusammen nur wenig länger als breit, die Seitenrandkante ist von oben nicht sichtbar. Die Punkte sind viel gröber als die des Pronotums, ganz irregulär. Die Epipleuren sind unvollständig.

Das *Prosternum* ist ganz wagerecht, vorn sehr scharf gekielt, nach hinten verbreitert es sich geradlinig, wird dort flach und endet halbkreisförmig. Das Mesosternum liegt tief, sogar das Metasternum ist vorn etwas heruntergedrückt; es ist zwischen den Hüften doppelt so lang wie der Durchmesser einer Hüfte, in der Mitte mit kaum einer Spur von Furche versehen. Der Abdominalfortsatz ist ziemlich spitz. Die kurzen Beine sind gelb, die Schenkeln unten scharf doppelkantig; an den Hintertarsen ist das erste Glied nur wenig länger als das zweite.

L. 1 mm.; Br. 0·7 mm.

Loc. Seychellen. 2 Exemplare von Silhouette: "near Pot-à-eau, about 1500′," viii. 1908.

Die Gattung *Heterophyllus* ist bisher nur aus Madagaskar bekannt gewesen. Ob *Het. natalis* Motsch. aus Natal hierher gehört, weiss ich nicht, mir ist die Art unbekannt, und die Beschreibung ist ganz ungenügend, so dass daraus kein sicherer Aufschluss über die Stellung der Art zu erreichen ist. Ausser den bekannten Art liegt mir noch eine Reihe neuer Arten in z. T. grosser Stückzahl in meiner Sammlung vor, deren Beschreibung einer späteren Zeit vorbehalten bleibt.

Unsere sehr winzige Art stelle ich nur mit Vorbehalt in die Gattung. Das vorn scharf gekielte Prosternum, das der ganzen Länge nach wagerecht ist, der vor den Wangen ganz abgestutzte Kopf würden sogar die Aufstellung einer neuen Gattung gerechtfertigt erscheinen lassen.

Subfam. **Phrenapatinae.**

In diese Unterfamilie gehören nach Gebien: Phil. Journ. Sc. viii. D. 1913, p. 389, nicht nur die 6 im Col. Cat. aufgeführten Gattungen, sondern auch *Arrhabaeus*, *Dioedus*, *Platycilibe*, *Brachycilibe*, *Phthora*, *Tagalus*. Die Unterfamilie ist ausgezeichnet durch fehlenden Skutellarstreifen, dadurch erscheint die ganze Deckenskulptur anders, denn der erste Streifen läuft der Naht ganz parallel. Alle Arten sind zylindrisch gewölbt, schwarzbraun oder braun, die Schienen sind gesägt, die Augen nicht ausgeschnitten, die Mandibeln ragen oft stark vor. Für die Mehrzahl der Gattungen ist das Vorhandensein einer Fühler-

furche charakteristisch, die sich auf der Unterseite des Kopfes zwischen Auge und Maxillarausschnitt nach hinten zieht. Sie fehlt nur bei *Phrenapates* und *Delagnatha* (ob *Scolytocaulus* und *Daochus* sie haben, weiss ich nicht, beide Gattungen sind mir unbekannt).

Fairmaire hat für einige madegassische Arten die Gattung *Pycna* aufgestellt, die er mit *Uloma* vergleicht: ein bequemer Vergleich, der natürlich zahlreiche Unterschiede ergibt, da beide Gattungen weit voneinander entfernt sind. Die Beschreibung ist in Col. Nov. Oberth. I.'1884 erschienen. So viel ich habe in Erfahrung bringen können, ist dieses Werk von dem Herausgeber aus dem Buchhandel zurückgezogen worden, ehe eine Verteilung an die Bibliotheken erfolgte. Ich habe mich vergeblich bemüht, eine Kopie der Arbeit von Fairmaire zu erhalten. Es scheint daher das Beste zu sein, wenn man dieses Werk unbeachtet lässt, wie ich es bereits im Col. Cat. getan habe. Da die meisten der von Fairmaire in diesem Werk in Diagnosenform veröffentlichten Arten später noch einmal beschrieben wurden, ist der Schade nicht sehr gross. Die hier inbetracht kommende Gattung und Art: *Pycna aphodina* ist Ann. Soc. Ent. Belg. 1894, p. 141 noch einmal veröffentlicht. Sie hat als Typus der Gattung zu gelten, trotzdem die unten aufgeführte Art *P. cavifrons* schon 1893 erschien. Denn die Gattungsbeschreibung steht bei *aphodina* und nimmt auf *cavifrons* keine Rücksicht. Überdies weicht die letztere durch 2-gliedrige Fühlerkeule so erheblich ab, dass sie nicht einmal bei *Pycna* verbleiben kann, welche, wie Fairmaire ausdrücklich schreibt, eine 4-gliedrige Keule haben soll. Sie gehört vielmehr zur Gattung *Tagalus*, welche bisher nur von den Philippinen bekannt war.

20. *Tagalus cavifrons*, Fairmaire.

(Tafel **23**, Fig. 9; Textfig. 13, 14.)

Pycna cavifrons Fairm., Ann. Soc. Ent. Belg. XXXVII. 1893, p. 540.

Eine sorgfältige Untersuchung der mir vorliegenden Exemplare von *Pycna cavifrons* ergibt, dass sie von der Gattung *Tagalus* nicht generisch getrennt werden kann. Die Unterschiede zwischen der Art von den Seychellen und den philippinischen Arten sind so

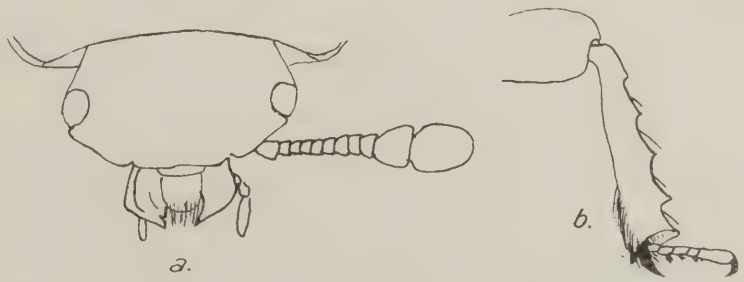


Fig. 13. *Tagalus cavifrons*: *a*, Kopf, × 25; *b*, Vorderbein, × 40.

geringfügig, dass sie nur als artliche Merkmale aufgefasst werden können, ja *cavifrons* steht dem *T. impressicollis* viel näher als dieser dem *T. schultzei*. Er unterscheidet sich von *impressicollis* durch viel geringere Grösse, vorn nur leicht und kurz eingedrückten Halsschild, dessen Vorderecken nur kaum vorgezogen sind und dessen Punktierung viel gröber und enger ist.

L. 2·1—4 mm.

Loc. Seychellen. Silhouette: "near mount Pot-à-eau," über 1000′, viii. 1908; Mare aux Cochons und Wald unmittelbar darüber, ix. 1908. Mahé: Cascade Estate, ca. 1000′, ii. 1909.

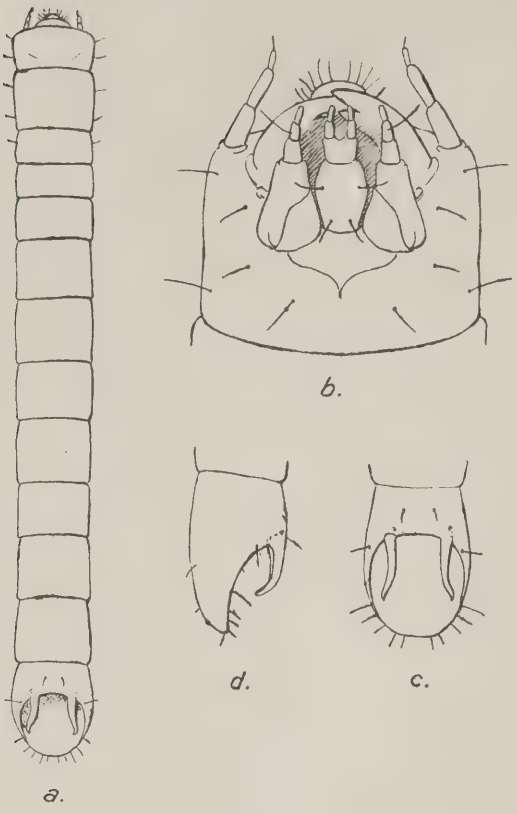


Fig. 14. *Tagalus cavifrons: a*, Larve von oben, × 14; *b*, Kopf von unten, × circa 50; *c*, letztes Hinterleibsegment von oben, × circa 22; *d*, dasselbe von der Seite.

Larve (Fig. 14): Von dieser Art wurde auch in 3 Exemplare die Larve mitgebracht. Sie sind denen von der nahe verwandten Gattung *Phthora* sehr ähnlich. Sie unterscheidet sich von ihnen besonders durch die Bildung des letzten Segmentes. Wie bei der europäischen Gattung hat es keine Spitze, sondern ist am Ende abgestutzt. Im übrigen ist die Bildung des Analsegmentes charakteristisch: es ist von oben nach unten ganz schräg abgeschnitten, der Abschnitt geht oben ungefähr von der Mitte des Segmentes an, er ist kräftig ausgehöhlt, die Aushöhlung ist scharfkantig, und die Kanten sind rund herum, auch hinten glatt. Von oben reichen über die Höhlung 2 lange, klauenförmige, fast parallele Spitzen, die von dem oberen Rand herkommen. Das letzte Segment ist nicht breiter als das vorletzte, während es bei *Phthora* birnförmig verbreitert ist. Die Larve ist sehr gestreckt, aber die Segmente sind deutlich quer.

Fundnotiz: "From rotten wood, highest forest of Silhouette, 29. vii. 1908."

Subfam. **Ulominae.**

21. *Uloma crenatostriata,* Fairm.

(Tafel **23**, Fig. 17.)

Fairmaire, Ann. Soc. Ent. Fr. (4) viii. 1868, p. 799.

Diese Art wird von Kolbe in seiner Arbeit über die Seychellen-Coleopteren nicht mit aufgeführt. Das Versehen ist leicht erklärlich. Zwar gibt der Autor der Art ausdrücklich Mahé, Seychellen als Fundort an. Gemminger und Harold haben die Art als eine madegassische aufgeführt und ich habe leider, ohne die Originalangabe zu prüfen, diese Angabe übernommen.

Die Beschreibung ist sehr dürftig. Nach einem reichlichen, mir vorliegenden Material erfolgt hier eine Neubeschreibung.

Flach und ziemlich breit, glänzend schwarzbraun, Fühler und Beine gelblich rot.

Der *Kopf* ist beim ♂ stärker, beim ♀ schwächer eingedrückt, der Eindruck ist flach und geht hinten bis auf die Stirn. Auf den erhabenen Teilen, also vor den Augen und auf dem Clypeus ist der Kopf wie abgeschliffen, etwas matt und nicht deutlich punktiert;

die Vertiefung dagegen, also besonders die Gegend der undeutlichen, breiten Quernaht, hat einige sehr deutliche Punkte. Der Hinterkopf ist stark punktiert. Beim ♀ ist die Punktierung auch auf dem erhabenen Teil sehr deutlich. Die obere Teil der Augen ist fast kreisrund, die Wangen sind kaum so breit wie die Augen. Das Epistom ist fast gerade abgestutzt. Die Oberlippe ist kräftig, aber stumpf quer gekielt, eine Gelenkhaut zwischen ihr und dem Clypeus ist nicht zu sehen. Die Fühler sind kurz und dick, Glied 3 ist länger als 4, vom 5. an haben alle Glieder eine sehr scharfe, obere Kante, schon das 5. ist deutlich quer, die folgenden immer stärker, die vorletzten sind fast 3 mal so breit wie lang, auch das letzte ist quer, beim ♂ hat das 9. Glied eine schwach und undeutlich rundlich vorgezogene vordere Ecke. Das Mentum ist in beiden Geschlechtern fast gleich, beim ♂ nur flacher als beim ♀; es ist hoch gebuckelt, der Buckel mit leichter Mittelfurche versehen, jederseits hinten mit breiter, schräger Längsfurche an den Seiten; der Buckel ist von den Seitenstücken vorn scharfkantig abgesetzt. Die Mandibeln sind am Ende scharf ausgeschnitten, aber nicht deutlich gefurcht. Das Endglied der Maxillarpalpen ist ziemlich breit, mit scharfer, äusserer Ecke versehen. Der Unterkopf ist hinter den Mundteilen breit und tief quer gefurcht.

Der *Halsschild* ist über $1\frac{1}{2}$ mal so breit wie lang, an den Seiten stark gebogen, in der Mitte am breitesten, auch zur Basis deutlich verengt, nach vorn stark. Die Punktierung ist kräftig, aber nicht dicht. Beim ♂ findet sich vorn ein Eindruck, der querüber nicht ganz die Hälfte der Breite, in der Längsrichtung ungefähr $\frac{1}{3}$ einnimmt. Die Mittellinie bleibt von der Punktierung schmal frei, die Randung ist vorn in der Mitte breit unterbrochen, an der Basis findet sich jederseits ein rundliches, starkes Grübchen, ihre Kante ist stark doppelbuchtig.

Die Seitenrandkante der *Flügeldecken* ist von oben überall sichtbar, die Decken sind von der Basis bis zur Spitze tief gefurcht, die Zwischenräume sind also sehr stark gewölbt, die Punkte der Streifen sind gröber als bei irgend einer andern mir bekannten Art, tief und rund, im 4. Streif stehen 21—25 Punkte, die Punktierung der Interstitien ist nur bei starker Vergrösserung sichtbar.

Das *Prosternum* ist vorn sehr tief gerandet, fällt nach vorn schräg ab und ist deutlich etwas kompress, hinten stark bis zum Grunde gewölbt, aber unmittelbar über dem Ende unten mit winziger Spitze. Das Mesosternum ist gesenkt, scharfkantig und schmal ausgeschnitten. Das Metasternum ist vorn dick gerandet, mit mittlerer, aber nicht vollständiger Längsfurche versehen. Die Punktierung ist an den Seiten stark, an denen der Abdominalsegmente grob und dort auch etwas längsrunzlig. Die ersten Segmente sind an den Seiten stark gerandet. Die Beine sind kurz, die Schenkel dick, unten einseitig scharf gekantet. Die Vorderschienen sind in beiden Geschlechtern gleich, ihre Innenkante ist leicht gebogen, oben nicht erweitert, mit Wimpersaum versehen. Die Aussenkante ist stark gekrümmt, mit ungefähr 8 grossen Zähnen versehen, das Ende ist innen nicht ausgezogen, sondern nur mit den gewöhnlichen 2 Enddornen versehen. Auf der Vorderseite fehlt die Kante, welche eine Tarsalfurche absetzt, sie ist nur am Ende durch einige Wimpern angedeutet, die Rückseite ist mit einigen in einer Reihe stehenden Zähnchen versehen, diese Reihe steht der Innenkante näher als der äusseren. Die Mittelschienen sind aussen dicht und scharf gestachelt; die hinteren haben an der Aussenkante nur nahe

dem Ende einige feine Stachelchen. Die Hintertarsen sind lang, Glied 1 ist etwas kürzer als die andern zusammen.

L. 7·5—9 mm.

In grösserer Zahl (auch im Museum Berlin) in beiden Geschlechtern.

Loc. Seychellen: Silhouette, Mahé. Silhouette: Mare aux Cochons, ca. 1000 Fuss, und 1 Exemplar "from highest peaks, over 2000 feet, 12. viii. 1908." Mahé: Cascade Estate, 1000—2000 Fuss, und andere Fundorte.

Ich wage nicht, Verwandtschaftsbeziehungen zwischen den Arten der grossen und sehr weit verbreiteten Gattung *Uloma* zu konstruieren. Besonders reich an Arten ist die orientalische Region, aber auch Afrika enthält viel mehr Arten als man bisher annahm. Die Arten sind einander meist ausserordentlich ähnlich und schwierig zu unterscheiden, aber als Angehörige der Gattung leicht zu erkennen. *Ul. crenatostriata* ist an der sehr groben Deckenskulptur leicht zu erkennen.

22. *Uloma intrusicollis*, Fairmaire.

Ann. Soc. Ent. Fr. (4) viii. 1868, p. 798.

? *Ul. hondana* Kolbe, Mitt. Mus. Hamburg, xiv. 1897, p. 91.

Fairmaire's Beschreibung von *Ul. intrusicollis* ist ganz ungenügend, doch ist die genaue Angabe des Fundortes Mayotte ein wichtiges Kriterium für die Art. Leider hat auch Chatanay, der unsere Art in seiner Arbeit über die Tenebrioniden der Comoren aufführt, keine Ergänzungen zu Fairmaires Beschreibung gegeben, ich vermute, dass die Art ihm nicht vorgelegen hat. Ich habe jetzt von den Comoren 1 ♀ vor mir, das ich für *Ul. intrusicollis* halten muss, denn die Beschreibung passt vollkommen auf das Tier. Und dieses Tier erweist sich als vollkommen identisch mit einer Reihe von ♀ einer Art aus Ostafrika, die Kolbe als *Uloma hondana* beschrieben hat. Da aber die wichtigsten spezifischen Merkmale bei den Ulomaarten sich im männlichen Geschlecht finden, so gebe ich die obige Synonymie einstweilen mit Vorbehalt.

Da Kolbe ebenfalls nur eine unzureichende Beschreibung von *Ul. hondana* liefert, so dürften einige Ergänzungen erwünscht sein.

Der *Kopf* ist kräftig, etwas ungleich punktiert, vorn querüber mit starkem, gebogenem Quereindruck versehen, der sich nicht nach hinten auf die Stirn fortsetzt. Das Epistom ist in beiden Geschlechtern gewulstet, vorn breit, aber sehr deutlich ausgeschnitten. Die Oberlippe ist in beiden Richtungen nur leicht gebogen, ein Querkiel fehlt, die Seitenecken sind scharf, die Gelenkhaut ist breit sichtbar. Die Fühlerglieder haben auf der Oberseite (also je nach dem folgenden Gliede hin) starke Sinnesporen, die aber nur auf dem vorletzten Glied einen vollständigen Kranz bilden. Das Mentum des ♂ ist blank und hat auf der flachen Scheibe einen gebogenen, scharfen Randkiel, der nur vorn und hinten offen ist; zwischen ihm und dem eigentlichen Rand findet sich hinten eine schmale Randfurche; auf der eingeschlossenen Scheibe stehen einige gröbere Punkte. Beim ♀ ist das Kinn nicht mit Randkiel, sondern nur mit starker und breiter Randfurche jederseits versehen, die Scheibe ist dichter, aber feiner punktiert und hat eine schwach angedeutete Mittellinie.

Der *Halsschild* des ♂ hat einen sehr grossen Eindruck, der so breit wie lang, sehr flach

ist, und hinten durch 2 kleine, rundliche Schwielen begrenzt wird. Das Pronotum ist nur schwach quer, die Seiten sind hinten fast geradlinig, parallel, sie sind nicht breiter als die Flügeldecken. Die Punktierung ist viel gröber als bei andern Arten, nicht dicht und enthält sehr feine Zwischenpunkte.

Die *Flügeldecken* sind ganz parallelseitig und haben scharfeckige Schultern, die Seitenrandkante ist von oben schwach sichtbar. Es sind tiefe Punktstreifen vorhanden mit kräftigen, aber viel feineren Punkten als bei *crenatostriata*. Die Zwischenräume sind deutlich, hinten stark gewölbt.

Das *Prosternum* ist hinter den Hüften verbreitert und ganz niedergebogen, jederseits fein gerandet; die Propleuren sind grob punktiert und nach hinten hin längsgestrichelt; ähnlich ist auch das Abdomen skulptiert. Das 1. Segment ist hart an der Seitenrandkante scharf gerandet, die Randfurche der folgenden Segmente ist vom Rande entfernt. Die Schienen sind in beiden Geschlechtern ziemlich gleich, die vorderen innen im ersten Drittel beim ♀ schwach, beim ♂ etwas stärker rundlich erweitert, die hinteren sind gegen das Ende verdickt und im letzten Drittel vorn in dieser Verdickung scharf gekielt.

L. 8·3—10 mm.

Loc. Comoren: Grande Comore (Voeltzkow); Mayotte (Humblot). Ostafrika: Nguelo in Usambara, Mhonda in Ungù.

Unsere Art ist von *Ul. crenatostriata* nicht nur durch viel schlankeren Körper, schmaleren Halsschild mit grober Punktierung verschieden, sondern besonders auch durch die Kopfbildung: der Eindruck ist nicht nach hinten auf die Stirn fortgesetzt, das Epistom ist kräftig ausgeschnitten, eine Gelenkhaut ist sehr deutlich, und die Oberlippe ist nicht quer gekielt. Ganz anders ist die Bildung des Kinnes beim ♂, ferner ist der Eindruck auf dem Pronotum nicht quer, sondern so breit wie lang und hinten von 2 kleinen Schwielen begrenzt, ausserdem ist die Innenkante der Vordertibien in beiden Geschlechtern leicht rundlich erweitert, bei *crenatostriata* dagegen nicht.

23. *Uloma scita*, Walk.

Walker, Ann. Mag. Nat. Hist. (3) II. 1858, p. 284; nec *Uloma scita* Fairm., Ann. Soc. Ent. Belg. XXXVIII. 1894, p. 37.

Ich habe in den Jahrb. Nass. Ver. Naturk. LXV. 1912, p. 234 ausgeführt, dass *Ul. scita* Walk. und *Ul. scita* Fairm. zwei ganz verschiedene Arten sind. Die letztere ist identisch mit *Ul. polita* Wied., eine in Vorder- und Hinterindien weit verbreitete eigentümliche Art. *Ul. scita* Walk. dagegen war, wie es bisher schien, auf Ceylon beschränkt. Sie ist klein, schmal, parallelseitig, ganz rotbraun, das ♂ hat einen kleinen, queren Eindruck auf dem Pronotum, der hinten nicht von kleinen Tuberkeln begrenzt ist, der Halsschild ist beim ♀ wesentlich gröber als beim ♂ punktiert, der Eindruck auf dem Kopf verflacht sich nach hinten, ohne sich auf die Stirn fortzusetzen; das Epistom ist fast gerade abgestutzt, zwischen ihm und der Oberlippe ist keine Gelenkhaut sichtbar, die Oberlippe ist am Vorderrand stumpf quer gekielt. Das Mentum ist in beiden Geschlechtern fast gleich, sanft gewölbt und jederseits mit gebogener Randfurche versehen. Eine sorgfältige Prüfung der Tiere von den Seychellen und von Ceylon (von beiden Fundorten liegen mir die Geschlechter vor) ergab die völlige Übereinstimmung.

Loc. 1 ♂, 2 ♀ von den Seychellen: (Merian leg.) im Museum Berlin.

Hier zeigt sich abermals eine interessante Beziehung zwischen der Fauna der Seychellen und der von Ceylon, ähnlich wie bei *Epiphaleria pallida*, in beiden Fällen kommt die Art nur auf den genannten Inseln vor, nicht darüber hinaus. Während aber das Vorkommen der *Epiphaleria* durch ihr Leben am Meeresstrande verhältnismässig leicht erklärt werden kann, handelt es sich bei unserer *Uloma* um ein Waldtier. Umso höher ist daher die Verbreitung zu bewerten.

24. *Uloma comorensis*, n. sp.

Ziemlich gedrungen, stark gewölbt, Flügeldecken fast zylindrisch, Körper rotbraun, etwas matt, Beine gelbrot, Hinterkörper nach hinten leicht erweitert.

Der *Kopf* hat vorn eine gebogene, starke Querfurche, die sich nach hinten verflacht, besonders beim ♂, bei welchem der Kopf in der Längsrichtung ganz flach ist. Die hinter den Augen befindliche Querfurche ist beim ♀ viel deutlicher als beim ♂, die Oberfläche ist bei dem letzteren fast glatt, gröbere Punkte finden sich nur im Nacken und hinter den Augen. Beim ♀ dagegen ist auch die Stirn deutlich, wenn auch sehr fein punktiert. Das Epistom ist flach, nicht aufgeworfen. Die Wangen sind in breitem Bogen verrundet, der Clypeus ist nicht ausgeschnitten, eine Gelenkhaut fehlt zwischen ihm und der Oberlippe, diese ist vorn nicht mit querem Kiel versehen, sondern hat nur einen etwas dickeren Rand. Die Fühler sind kurz und dick, Glied 4 ist so breit wie lang, die folgenden werden immer stärker quer, die vorletzten sind 3 mal so breit wie lang, auch das letzte ist kräftig quer. Die Sinnesporen sind auffallend gross, silberweiss, sie finden sich auf dem letzten Glied und auf der Oberseite (dem Abschnitt, welcher dem folgenden Gliede zugekehrt ist), bilden aber nur bei den beiden vorletzten Gliedern einen vollständigen Kranz. Das Kinn ist in den Geschlechtern wenig verschieden, es ist sanft gewölbt, sehr fein und unregelmässig punktiert, hinten jederseits tief gefurcht, beim ♂ ist die Scheibe neben der Furche schräg nach vorn sehr stumpfkielig und undeutlich erhaben; die Mittellinie ist breit und seicht vertieft.

Der *Halsschild* ist 1½ mal so breit wie lang, die Seiten sind stark und gleichmässig gerundet, viel breiter als die Basis der Flügeldecken, auch beim ♀, die Spitze ist, von oben gesehen, ganz leicht ausgebuchtet, die Basis fast gerade, nur die Hinterecken sind leicht nach hinten gezogen. Der Eindruck vorn beim ♂ ist kräftig quer, nicht sehr tief und geht nicht bis zur Mitte, er ist etwas deutlicher punktiert als die sehr fein und ziemlich dicht punktierte Scheibe; die Punkte sind beim ♀ nur wenig gröber.

Die *Flügeldecken* sind nicht parallel, sondern nach hinten deutlich erweitert, die Seitenrandkante ist von oben garnicht sichtbar. Die Schultern sind kräftig vorgezogen. Es sind fein eingeschnittene, fast glatte Streifen vorhanden, deren Punkte sehr dicht und ausserordentlich fein, bei schwacher Vergrösserung nicht erkennbar sind. Die Zwischenräume sind vorn mässig gewölbt, hinten fast flach, da dort die Streifen undeutlich werden, sie sind mikroskopisch fein querrunzlig und erscheinen daher matt.

Das *Prosternum* fällt hoch, steil, fast senkrecht, aber ganz gerundet ab, senkt sich vorn fast geradlinig und ist dort leicht kompress. Die Propleuren sind sehr fein punktiert, die Punkte hinten leicht länglich. Das Abdomen ist matt, äusserst fein lederrunzlig, in

der Mitte kaum wahrnehmbar punktiert, an den Seiten seicht längsrunzlig und mit gröberen Punkten versehen. Die Randung der Abdominalsegmente ist fast gleichbreit. Die Vorderschienen sind zur Spitze kräftig verbreitert, innen fast geradlinig, die hinteren sind zur Spitze gleichmässig verdickt, innen in der Endhälfte oder im Enddrittel mit sehr fein aufgesetztem Kiel versehen.

L. 7·8—8·6 mm.; Br. (am Halssch.) 3—3·3 mm.

Loc. Grande Comore: Küste (Voeltzkow leg.).

5 ♂, 4 ♀ im Museum Berlin und in meiner Sammlung.

Obgleich diese Art nicht auf den Seychellen und den benachbarten Inselgruppen gefunden wurde, halte ich ihre Beschreibung doch für wünschenswert, weil die Fauna der Comoren viel Übereinstimmendes mit derjenigen der Seychellen hat, so dass *Ul. comorensis* auch dort aufgefunden werden könnte. Sie ist leicht wieder zu erkennen an dem breiten, seitlich stark gerundeten Halsschild, an der fast matten, sehr fein lederrunzligen Oberseite, den nahezu glatten Punktstreifen, die nur fein eingeschnitten sind.

Tabelle zur Bestimmung der auf den Seychellen und benachbarten Inseln heimischen Uloma-Arten.*

1. Oberseite fast matt, die Punktstreifen sind fast glatt, ihre Punkte nur bei guter Vergrösserung sichtbar, Hinterkörper nach hinten leicht erweitert, Seiten des Pronotums stark gerundet, breiter als die Basis der Decken.....*comorensis* Geb.

Oberseite blank, Punktstreifen mit sehr deutlichen Punkten, Hinterkörper parallelseitig, Seiten des Pronotums hinten fast gerade, so breit wie die Flügeldecken .....2.

2. Körper kurz und breit, Flügeldecken mit groben Punkten in den Streifen, Basalrand des Pronotums stark doppelbuchtig, eine Gelenkhaut zwischen Oberlippe und Epistom fehlt, letzteres gerade abgestutzt.....*crenatostriata* Fairm.

Körper gestreckt, wie bei *Ul. culinaris*, Punkte der Streifen fein, Basis des Pronotums schwach doppelbuchtig.....3.

3. Oben glänzend schwarzbraun, Epistom ausgerandet, mit deutlicher Gelenkhaut, Oberlippe vorn ohne Querkiel, Eindruck des Pronotums beim ♂ gross, rundlich, hinten mit 2 Tuberkeln, Punktierung beim ♀ grob.....*intrusicollis* Fairm.

Oben glänzend rotbraun, Epistom gerade abgeschnitten, Oberlippe vorn mit querem Kiel, Eindruck des Pronotums klein, quer, hinten ohne Tuberkeln, Punktierung beim ♀ fein .....*scita* Walk.

Alphitobius, Steph.

Ill. Brit. Entom. v. 1832, p. 11 (weitere Litteraturangaben siehe Gebien: Col. Cat. pars 28, p. 404).

Syn. *Microphyes* Macl., Trans. Ent. Soc. N.S. Wales, II. 1872, p. 286.
Cryptops Sol., *Heterophaga* Redt.

* Ich benutze diese Gelegenheit festzustellen, dass *Uloma thoracica* Geb., Jahrb. Nass. Ver. Naturk. LXV. 1912, p. 232 mit *Ul. spectabilis* Perty identisch ist.

25. *Alphitobius laevigatus*, F., Spec. Ins. I. 1781, p. 90; Syst. El. I. 1801, p. 117. Blair, Ann. Mag. Nat. Hist. (8) XIII. 1914, p. 486.

Syn. *rufipes* Macl. (*Microphyes*), Trans. Ent. Soc. N.S. Wales, II. 1872, p. 286.
piceus Ol., Encycl. méth. VII. 1792, p. 50*.

Die Art ist Kosmopolit, durch Korn- und Mehlvorräte über die ganze Welt verbreitet.

Loc. Seychellen: Mahé, 1908—9. Amiranten: Darros I., 1905. Cargados: Siren I. und Establishment I., 1905. Assumption: 1908 (Fryer). Rodriguez: 1918 (Snell und Thomasset).

26. *Alphitobius crenatus*, Klug.

(Tafel **23**, Fig. 19.)

Kl., Ins. Madag. 1833, p. 92. Fairm., Ann. Soc. Ent. Fr. (4) IX. 1869, p. 231. Kolbe, Abh. Senckenb. Nat. Ges. XXVI. 1902, p. 580.

luctuosus Fairm., *loc. cit.*, p. 230.

Loc. Amiranten: Eagle, Poivre, Darros, Desroches Inseln (1905, "common"). Farquhar Atoll, 1905. Coetivy, 1905. Cargados: Siren Island, 1905. Aldabra: 1907 (Thomasset); Picard I., i. 1909 (Fryer). Astove: 1907 (Thomasset). Seychellen: Bird I., Dennis I., Long I., Praslin, Mahé (Cascade Estate, ca. 1000 Fuss), Silhouette ("country near sea-level"). Von Mahé auch von Brauer in Anzahl, und von Voeltzkow (iv.—v. 1895).

Ferner bekannt von den Comoren (Nioumokelé, Moheli, Mayotte); Nossi-Bé; Madagaskar (verschiedene Fundorte). Ausserdem führt Kolbe die Art auch vom Festlande (Sansibar) an.

Diese Art ist, wie es scheint, auch myrmekophil, und vielleicht gesetzmässig; denn sie wurde zusammen mit Larven bei Ameisen gefunden. Die betr. Notiz lautet: "Long Island (Mahé), vii. 1908, found in decaying log with *Pheidole punctulata* Mayr, and with other Coleoptera and Lepismatidae." Doch trägt ein anderes Etikett, auf dem sich ebenfalls Larven aufgeklebt befinden, die Notiz: "Silhouette, country near sea-level, found together at root of a bush."

Mir lagen über 150 Exempl. vor.

Die *Larven* sind leider trocken aufbewahrt, sie scheinen aber ganz mit den, mir nur aus der Beschreibung bekannten Larven unserer europäischen Arten übereinzustimmen.

27. *Tribolium castaneum*, Herbst.

Syn. *ferrugineum* auct. nec F. (s. Blair, Entom. Mo. Mag. (2) XXIV. 1913, p. 222; weitere Litteraturangaben in Gebien: Col. Cat. pars 28, p. 394).

Diese gemeine, kosmopolitische Art ist durch Mehlvorräte, Backwaren über die ganze Welt verbreitet, übrigens auch oftmals an Naturalien, in Sammlungen etc. schädlich.

Loc. Seychellen. Mahé: Morne Blanc, ca. 1000 Fuss, 1908, "bred from wood of dead 'Bois montaigne' (*Campnosperma seychellarum*)." Silhouette: "near Pot-à-eau, viii. 1908; Mare aux Cochons, plateau or jungle near by, about 1000 feet."

* Über die weitere umfangreiche Synonymie ist nachzulesen in Gebien: Col. Cat. pars 28, p. 405.

PALORUS, Muls.

Col. France, Latigènes, 1854, p. 250*.

28. *Palorus mahenus*, n. sp.

Verhältnissmässig sehr kurz und gewölbt, glänzend gelbbraun.

Der *Kopf* ist stark quer, die Augen treten aus seiner Wölbung fast halbkugelförmig heraus, der Wulst des Kopfes ist nur vorn am Epistom stark abgesetzt und zwar durch eine sich hinten verflachende, glänzende Querfurche, die sich aber an den Wangen verliert. Der Wulst verdeckt die Vorderwinkel der Augen nicht, sondern es finden sich sogar kleine, aber scharfe Augenfurchen neben ihnen. Das Epistom ist gerade abgestutzt, fast etwas ausgeschnitten, der mittlere Teil ist kissenförmig gewölbt. Die Punktierung ist dicht und sehr deutlich, die Stirn gewölbt. Die Mandibeln sind sehr klein, die Oberlippe fast versteckt. Die sehr kurzen Fühler überragen die Vorderecken des Pronotums nur wenig, Glied 1 ist von oben nicht sichtbar, so dick wie 2, 3 ist viel schmaler, so breit wie lang, 4, 5, 6 sind quer, dicht geschlossen, 7, 8, 9, 10 bilden eine kräftige Keule, sie sind stark quer, ineinander gesetzt, das 11. ist so lang wie breit, die Keule ist stark depress.

Der *Halsschild* ist auffallend quer, stark gewölbt, deutlich breiter als die Flügeldecken. Vorn, wo die grösste Breite liegt, ist das Pronotum fast doppelt so breit wie in der Mittellinie lang. Die Seiten sind stark gerundet, nicht gerade, sie verengen sich nach hinten stark, am Ende geradlinig, fast etwas eingezogen. Die Vorderecken sind abgeschnitten, nicht vorragend, die Mitte ist in leichtem Bogen vorgezogen, die Seiten sind besonders vorn verflacht. Die Hinterecken sind scharf stumpfwinklig, die Punktierung ist wenig dicht und sehr deutlich.

Die *Flügeldecken* sind querüber stark gewölbt, der Seitenrand ist von oben gerade noch vollständig sichtbar. Von oben gesehen ragen die Schulterecken sehr fein und kurz zahnförmig vor. Die Seiten sind nicht ganz parallel, sondern im ersten Drittel zur Schulter schwach verengt. Die Punktreihen sind fein und nicht vertieft. Die Zwischenräume haben eine undeutliche, unordentliche, nur bei starker Vergrösserung sichtbare Punktreihe.

Die *Unterseite* ist vorn grob punktiert, besonders auf dem ganzen Prosternum, der Prosternalfortsatz ist parallelseitig, flach, gerade, am Ende scharf quer abgeschnitten. Das Mesosternum ist nur schwach eingedrückt, die letzten Segmente des Abdomens sind äusserst fein punktiert. Die Beine sind kurz und dünn, die Vorderschienen haben eine scharfe Aussenendecke; die Vorder- und Mitteltarsen sind scheinbar 4-gliedrig, da das 1. Glied noch mehr als bei andern Arten versteckt ist.

L. 2 mm.

Loc. 3 Exemplare von den Seychellen: Long Island, vii. 1908; 2 Exemplare haben die Notiz: "found in decayed log together with the ant *Pheidole punctulata*, Mayr, and with other Coleoptera and Lepismatidæ †."

Diese kleine Art ist an dem stark gewölbten Körper, den an dem sehr queren Halsschild stark gerundeten Seiten leicht kenntlich. Sie entfernt sich von dem kosmopolitischen

* Ausführliche Litteraturangaben siehe Gebien: Col. Cat. pars 28, p. 396.

† [See also under *Alphitobius crenatus*, p. 302, opposite.—H. S.]

P. subdepressus durch ganz andere Kopfbildung, da der Seitenrandwulst nicht die Vorderecken der Augen überdeckt; von den andern Arten unterscheidet sie sich durch die Halsschildbildung, auch die Fühler sind charakteristisch; *P. humeridens* Geb. von Borneo hat z. B. überhaupt keine Fühlerkeule, bei andern Arten sind die Glieder viel gestreckter, besonders die ersten. Aus dem unserm Faunengebiet benachbarten Madagaskar ist nur *P. quadricollis* bekannt. Er ist über doppelt so lang (5 mm.) und hat einen ganz quadratischen Halsschild, der durchaus nicht nach hinten verengt ist und daher scharf rechtwinklige Hinterecken hat, ausserdem sollen die Fühler fast zylindrisch sein.

29. *Palorus praslinensis*, n. sp.

Sehr lang gestreckt, fast zylindrisch im Hinterkörper, gelblich, schwach glänzend.

Der *Kopf* ist kaum quer, stark gewölbt, die Augen schwellen schwach aus der Wölbung des Kopfes, sind aber ganz frei sichtbar, die Wangen liegen also, wie bei den meisten Arten, innen von ihnen, überdecken ihren Innenrand nicht. Die Augenfurchen sind schmal und gut ausgeprägt, sie schnüren hinten deutliche Schläfen ab und sind vollständig, laufen also vorn in die Querfurche. Diese ist tief aber schlecht begrenzt, hinten, in der Mitte etwas in die Stirn eingezogen. Die Fühler sind kurz, Glied 3 ist viel kleiner als 2, schwach quer, die folgenden werden immer stärker quer, die vorletzten sind über doppelt so breit wie lang, das letzte ist gestreckt, oval.

Der *Halsschild* ist in der Mittellinie so lang wie an der breitesten Stelle breit. Diese liegt unmittelbar hinter den Vorderecken; von dort ist die Verengung gleichmässig, ziemlich stark, geradlinig. Die Hinterecken liegen weiter auseinander als die Augen aussen; die Vorderecken treten nicht vor, sondern sind kurz verrundet, während die hinteren sehr scharf stumpfwinklig sind, die Mitte des Vorderrandes ist schwach nach vorn, die Basis stärker, in gleichmässigem Bogen nach hinten gezogen und fein und vollständig gerandet. Die Wölbung ist gleichmässig bis zum Rande, es fehlt also eine stumpfe Seitenkante. Die Punktierung ist wie die des Kopfes fein und nicht gedrängt. Das Schildchen ist über doppelt so breit wie lang.

Die *Flügeldecken* sind so stark gewölbt, das die Seitenrandkante von oben gerade noch sichtbar ist. Ein deutliches Schulterzähnchen ist nicht vorhanden. Es sind Reihen ziemlich grober Punkte entwickelt. Die flachen Zwischenräume haben eine Reihe sehr feiner Punkte, nur der Nahtstreif ist unregelmässig punktiert.

Alle *Schienen* sind schlank und dünn, die vorderen haben eine deutliche Aussenendecke. Die Mitteltarsen lassen nur 4 Glieder erkennen.

L. 2·4 mm.

Loc. 1 Exemplar von den Seychellen. Praslin: "Côtes d'or Estate, from Coco-de-Mer (*Lodoicea*) forest in the Vallée de Mai, xi. 1908."

Diese Art ist an dem sehr schlanken Körper, der Kopfbildung, der Gestalt des Pronotums leicht kenntlich. Sie steht dem *P. ficicola* Woll. am nächsten, ist ähnlich gebaut, hat aber lange, bis vorn laufende Augenfurchen, gröber punktierte Decken, geradlinig nach hinten verengten Halsschild, dessen Basis in kräftigem Bogen nach hinten gezogen ist und nicht fast geradlinig abgeschnitten. Bei beiden Arten sind an den Mitteltarsen nur 4 deutliche Glieder vorhanden.

EUTOCHIA.

J. Leconte, Class. Col. N. Amer. 1862, p. 238 (nom. nov.). Horn, Revis. Tenebr. 1870, p. 372. Lec. und Horn, Class. Col. N. Amer. 1883, p. 381. Bates, Ent. Mo. Mag. x. 1872, p. 97.

Aniara Lac., Gen. Col. v. 1859, p. 336 nota (nom. praeocc.).

Aniarus Gemm. und Har., Cat. Col. VII. 1870, p. 1964 (nom. nov.).

Cenoscelis Woll., Col. Hesper. 1867, p. 179.

Delopygus J. Lec., New spec. Col. 1866, p. 129.

Holaniara Fairm., Ann. Soc. Ent. Fr. (5) I. 1871, p. 43 (nom. nov.).

Diese Gattung ist sehr verkannt worden, ihre Arten wurden in den verschiedensten Gattungen untergebracht, meist bei *Alphitobius*, fast alle sind ungenügend beschrieben. Da einige Arten sehr weit verbreitet und in den Sammlungen sehr häufig sind, kann es nicht wundernehmen, dass sie mehrfach beschrieben wurden. Daher befindet sich die Synonymie in heilloser Konfusion und ich bedaure sehr, dass es mir unter den gegenwärtigen Verkehrsverhältnissen nicht möglich ist, volle Aufklärung über die inbetracht kommenden Arten zu geben. Dazu bedürfte es der Einsicht in die Typen aller Autoren. Fauvel hat sich mit der am weitesten verbreiteten Art in seiner Fauna von Neu-Caledonien befasst und eine vollständige Synonymie dieser Art (*Eu. tibialis* Woll.) gegeben, die ich für identisch mit *Eu. pulla* Er. halte. Ich fürchte aber, die Tiere von Neu-Caledonien, Neu-Guinea gehören einer andern Art an als die von Afrika. Meine Exemplare von diesen Fundorten und von Indien haben beim ♂ unten behaarte Mittel- und Vorderschenkel, meine Afrikaner nicht, die letzteren sind ausserdem grösser.

Die Sache wird leider dadurch verwickelter, dass Fairmaire, der selbst zu *tibialis* (=*pulla*) 2 Synonyme geliefert hat, also 2 Arten, die hierher gehören, noch einmal als neu beschrieb, auch wieder dieselbe Art, oder eine nahe verwandte als *Uloma fastidiosa*, beschrieb, die sich wohl kaum als etwas anderes erweisen dürfte, als diese in ganz Afrika gemeine Art. Ob auch *Eu. vidua*, die Fairmaire ausdrücklich von den Comoren erwähnt, auch hierher gehört, muss ich unentschieden lassen.

Die Geschlechter sind an der Bildung der Labialpalpen leicht zu unterscheiden.

30. *Eutochia pulla*, Er.*

Eine im ganzen tropischen und südlichen Afrika häufige Art, auch in Ägypten und im Sudan vorkommend. In Ostafrika gemein.

Loc. Seychellen. Praslin, xi. 1908. Silhouette, niedriges Land nahe der See, viii. 1908. Mahé: 1905 (Gardiner). Auch im Berliner Museum von Mahé.

Subfam. **Tenebrioninæ.**

CRYPHAEUS, Klug, Ins. Madag. 1833, p. 19.

Subg. *Anthracias* Redt., Fn. Austriaca, ed. II. 1858, p. 617†.

Über den Umfang der Gattungen *Toxicum* und *Anthracias* sind bisher die Meinungen schwankend gewesen. Als trennende Charaktere sind die entweder geteilten oder ungeteil-

* Die ausführliche Synonymie findet sich in Gebien: Col. Cat. pars 28, p. 409.

† Weitere Litteraturangaben sind zu ersehen aus Gebien: Col. Cat. pars 28, p. 462.

ten Augen und die 3- oder 4-gliedrige Fühlerkeule anzusehen. Lacordaire betrachtet die Bildung der Fühlerkeule als Haupteinteilungsgrund, darnach hat *Toxicum* 4-gliedrige Fühlerkeule und geteilte oder ungeteilte Augen, *Anthracias* 3-gliedrige Fühlerkeule und ebenfalls geteilte oder nur eingeschnürte Augen. Fasst man dagegen die Bildung der Augen als wichtigeren Teilungsgrund auf, so hat *Anthracias* geteilte Augen und eine 3- oder 4-gliedrige Keule und *Toxicum* ungeteilte Augen und ebenfalls eine 3- oder 4-gliedrige Keule. Der Umfang der Gattungen ist natürlich je nach der Auffassung ein ganz verschiedener. Ich halte dafür—in Übereinstimmung mit Pic, dass *Anthracias* auf die Arten mit geteilten Augen bezogen werden muss. *Type: A. cornutus.* Geteilte Augen haben alle afrikanischen Arten, die also zu *Anthracias* zu stellen sind.

Nun ist übersehen worden, dass Klug seine Gattung *Cryphaeus* schon viel früher beschrieben hat. Merkwürdigerweise hat man den Namen als nomen nudum betrachtet, obgleich Klug eine gute Beschreibung liefert, allerdings nicht im Hauptteil der Arbeit, sondern in der langen Einleitung seines Werkes. Der Typus seiner Gattung: *Cr. aries* ist identisch mit *Toxicum* (*Anthracias*) *taurus* F., der geteilte Augen hat. Demnach ist *Anthracias* in meinem Sinne = *Cryphaeus*, kann aber als Untergattung für die mit 3-gliedriger Fühlerkeule versehenen Arten bestehen bleiben (z. B. *cornutus*, *duellicus*). Folgerichtig muss auch *Toxicum* aufgeteilt werden, dieser Name ist auf Arten mit 4-gliedriger Fühlerkeule (die meisten mit ungeteilten Augen) zu beschränken, für solche mit 3-gliedriger Keule (z. B. *punctipenne*) ist eine neue Untergattung zu errichten.

Ich lasse nur mit Vorbehalt unsere Gattung und *Cryphaeus* bei der Unterfamilie Tenebrioninae. Die fehlende Gelenkhaut zwischen den letzten Abdominalsegmenten fordert eine Abtrennung von den Tenebrioninen. Sie stimmt da mit den Belopinen (Calcarinen) überein.

31. *Cryphaeus taurus*, F.

Syst. El. I. 1801, p. 153. Cast., Hist. Nat. II. 1840, p. 217. Lacord., Gen. Col. Atl. t. 55, f. 2. Fåhr., Öfv. Vet. Akad. Förh. XXVII. 1870, p. 303.

aries Kl., Ins. Madag. 1833, p. 177 (sep. p. 89). Cast., Hist. Nat. II. 1840, p. 217. Fairm., Ann. Soc. Ent. Fr. (4) IX. 1869, p. 228.

favareli Pic, Échange, XXIX. 1913, p. 158.

gazella, Fåhr., Öfv. Vet. Akad. Förh. XXVII. 1870, p. 304; nec Fabr., s. Blair, Tr. Ent. Soc. London, 1921, p. 273.

nitidifrons Schauf., Horae Soc. Ent. Ross. XIX. 1885, p. 206.

nitidior Pic, Échange, XXIX. 1913, p. 159.

opacum Schauf., Horae Soc. Ent. Ross. XIX. 1885, p. 202.

subnitidus Pic, *loc. cit.*, p. 158.

tenuiclavum Schauf., *loc. cit.*, p. 202.

Cryphaeus taurus F. ist bei Fabricius eine Mischart, da er als Fundort Guinea und Ind. or. angibt, wo die Art nicht vorkommt. Ebenso bezieht Fåhraeus das *Toxicum gazella* auf Tiere von Caffraria und der Malayischen Halbinsel. Tatsächlich kommen in Asien sehr ähnliche Arten vor. Welche von diesen von Fabricius und Fåhraeus mit unserer afrika-

nischen Art verwechselt wurden, kann ich nicht mehr feststellen. Es schien mir auch wichtiger mit den zahlreichen von Pic und Schaufuss aufgestellten Arten ins Reine zu kommen. Die Arten von Schaufuss sah ich in Berlin. Soviel ich erinnere, sind sie nur leichte individuelle Abänderungen der gemeinen, nicht einmal sehr veränderlichen Art. Auch Pic hat geglaubt, auf Grund winziger Skulptur- etc. Merkmale neue Arten gründen zu müssen. Von seinen afrikanischen Arten haben mir *A. subnitidus* und *nitidior* in typischen Exemplaren vorgelegen, beide sind nichts weiter als fettige Stücke von *Cr. taurus*, das eine mehr, das andere weniger. Infolgedessen zeigen sie einen gewissen Glanz. Aber das Vorhandensein einer unsauberen oder schmierigen Oberflache hat bisher nicht als Artunterschied gegolten. *Anthr. favareli* habe ich in Originalstücken nicht gesehen, aber da der Autor als einzige Unterschiede nur anzugeben weiss: "Plus parallèle que *A. cornutus* F. (soll natürlich *A. taurus* F. heissen, denn *A. cornutus* ist eine palaearktische Art) et à ponctuation différente," so zweifle ich nicht, dass diese Art mit unserer zusammenfällt.

Als Unterschiede zwischen den Arten von *Toxicum* wurden von Pic und Schaufuss besonders der mehr oder minder starke Glanz des Körpers oder des Kopfes, die Bewaffnung des Kopfes beim ♂, die Skulptur der Oberseite herangezogen. Was die Hornbildung anbetrifft, so ist allgemein bekannt, dass bei fast allen Käfern mit Hornbildung auf dem Kopf oder Pronotum des Männchens, dieses Merkmal starken individuellen Schwankungen unterworfen ist. Es finden sich bei Tieren derselben Lokalität, ja unter Umständen, die darauf schliessen lassen, dass sie einem und demselben Eigelege entstammen, Männchen mit vorzüglicher Hornbildung und andere, bei denen die Hörner auf kleine Erhabenheiten reduziert sind. Die meisten der unter den Synonymen aufgeführten Arten sind auf Männchen mit mehr oder minder guter Hornbildung gegründet. Auch die Skulptur der Oberseite hat oft als gutes Kriterium bei den inbetracht kommenden Arten und bei ihren Synonymen gegolten. Es lässt sich nicht leugnen, dass scheinbar grosse Verschiedenheiten bestehen. Doch scheint nie beachtet worden zu sein, dass ganz frische, reine Stücke stets mit einem russähnlichen, leicht abreibbaren Überzug versehen sind, welcher die Punkte der Decken und des Pronotums so überdeckt, dass von ihnen wenig zu sehen ist. Der Überzug kann durch einfaches Überstreichen mit dem Finger oder einem steifen Pinsel entfernt werden, und die Skulptur tritt deutlich hervor. Ganz dieselbe Eigentümlichkeit finden wir bei den Arten der Gattungen *Eupezus* und *Pyanisia*. Natürlich ist auch, schon die weite Verbreitung der Art lässt das vermuten, eine gewisse Veränderlichkeit inbezug auf Grösse, Punktierung etc. vorhanden.

Die vorliegende Art ist allerdings bisher auf den Seychellen nicht gefunden worden, sie ist aber im ganzen tropischen Afrika gemein, auch auf Madagaskar heimisch und wird von Chatanay (als *Toxicum aries*) auch von den Comoren angegeben. Besonders aus nomenklatorischen Gründen musste auf diese Art näher eingegangen werden.

32. *Cryphaeus capreolus*, Fairm.

Ann. Soc. Ent. Fr. (4) IX. 1869, p. 228.

Cr. capreolus dürfte kaum Artrecht beanspruchen können, vielmehr als insulare Unterart von *taurus* anzusprechen sein. Sie ist dem letzteren täuschend ähnlich, etwas schmaler, rauher skulptiert und wesentlich kleiner. *C. capreolus* ist 8—10½ mm. gross (Durchschnitt

von 275 Exempl. = 8·75 mm.), *C. taurus* dagegen 8—14½ mm. gross (Durchschnitt von 400 Tieren = 12·25 mm.); wobei die Hörner des ♂ nicht mitgerechnet sind.

In grosser Zahl von den Seychellen.

Loc. Mahé: Mamelles, vi.—vii. (Brauer); Cascade Estate, ca. 1000′, xii. 1908. Long Island, vii. 1908. Silhouette: ca. 1500′, viii. 1908; Kulturland und Küste, ix. 1908. Praslin: 1905 (Gardiner). Ferner von den Comoren: Moheli, x. 1903 (Voeltzkow).

PSEUDHADRUS, Kolbe, Mitt. Zoolog. Mus. Berlin, v. 1910, p. 31.

Über diese hochinteressante, auf den Seychellen endemische Gattung habe ich schon in der Einleitung ausführlich berichtet.

Die systematische Stellung der Gattung ist schwierig zu präcisieren. Ich habe schon an anderen Stellen betont, auf wie schwachen Füssen die Systematik der Tenebrioniden mit Gelenkhaut zwischen den letzten Abdominalsegmenten steht, die dazu gehörigen Unterfamilien, mit ihren tausenden von Arten sind schlecht von einander abgegrenzt. Ich möchte *Pseudhadrus* vorläufig nur als isoliert stehende Gattung der Tenebrioninae s. str. auffassen. Wegen der verkürzten Hinterbrust kommt sie hier in die Nähe von *Coelocnemis*, *Hypaulax*, *Coelometopus*, mit denen sie aber sonst keine Ähnlichkeit hat.

33. *Pseudhadrus braueri*, Kolbe.

Kolbe, *loc. cit.*, p. 33.

Diese Art ist grösser als *Ps. seriatus* (15·6—18 mm.), hat sehr lange Schienen, von denen die vorderen und mittleren kräftig gebogen sind, die Skulptur der Decken ist feiner, der Halsschild verengt sich nach hinten. Im übrigen ist diese Art variabel wie die folgende, und es ist nicht ausgeschlossen, dass sich nach Eingang eines grossen Materiales beide als Formen einer sehr veränderlichen Art ausweisen. Der Kiel auf den umgeschlagenen Seiten der Flügeldecken, welcher dieser Art eigentümlich sein soll, fehlt einem der beiden von der Seychellen-Expedition mitgebrachten Stücken ganz und ist beim andern schwach angedeutet. Ebenso ist er bei *seriatus* entweder sehr deutlich, oder schwach, oder fehlt, oft ist er unter einer Schmutzschicht verborgen. Der Rand der Flügeldecken ist bei dem Originalstück von Kolbe glatt, ebenso bei einem der genannten Stücke, beim zweiten dagegen deutlich uneben.

Loc. Seychellen. Silhouette: nahe Mont Pot-à-eau, ca. 1500′, 18. viii. 1908, mit der Notiz: "On ground in dead 'Bois Rouge' (*Wormia ferruginea*) leaves, in jungle." "Silhouette, in Wäldern des Gebirges, in einer Höhe von 400—500 m., unter Blättern von Kokospalmen auf feuchtem Boden (Brauer)."

34. *Pseudhadrus seriatus*, Kolbe.

(Tafel **23**, Fig. 2; Textfig. 15—17.)

Kolbe, *loc. cit.*, p. 32.

Diese Art scheint die häufigere von beiden zu sein. Mir legen 11 Exemplare vor. Die Stücke, die ich zu dieser Art rechne, sind kleiner (11—15·5 mm.), die Beine sind kurz, die Schienen fast gerade, der Rand des Hinterkörpers ist ziemlich scharf gesägt, die Körner der Decken sind gröber.

Loc. Seychellen. Mahé: "from forest of rather stunted Capucin trees (*Northea*) on summit of 'Montagne Anse Major,' 2000 feet or over, 1. ii. 1909"; Cascade Estate, ca. 800—1500 Fuss; "bred from larva found in rotten wood, high forest of Morne Seychellois."

Fig. 15. *Pseudhadrus seriatus*, Kopf, × 12.

Silhouette: nahe Mont Pot-à-eau, über 1000′, viii. 1908; Mare aux Cochons, ix. 1908. "Mahé: in alten feuchten Wäldern mit üppiger Vegetation im Innern der Insel, 600—750 m. hoch, 1 Exemplar. Auch auf der Insel Silhouette in Wäldern des Gebirges unter Blättern von Kokospalmen, 400—500 m. hoch, 3 Exemplare (Brauer)." 2 Stücke auch von der deutschen Tiefsee-Expedition mitgebracht.

Von dieser Art liegt mir die Larve vor, aus einer 2. Larve wurde unsere Art gezogen.

Larve (Fig. 16, 17): Körper langgestreckt zylindrisch, aber unten flach, gelblich. *Kopf* geneigt, jederseits mit 3 Ocellen, die in einer Reihe stehen und gleich gross sind, innen,

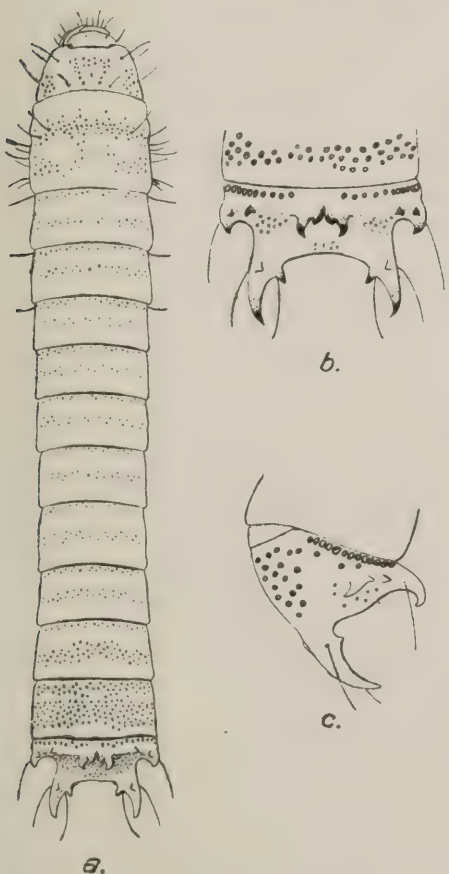


Fig. 16. *Pseudhadrus seriatus*: *a*, Larve von oben, × 6; *b*, letztes Hinterleibsegment von oben, × circa 9·6; *c*, dasselbe von der Seite.

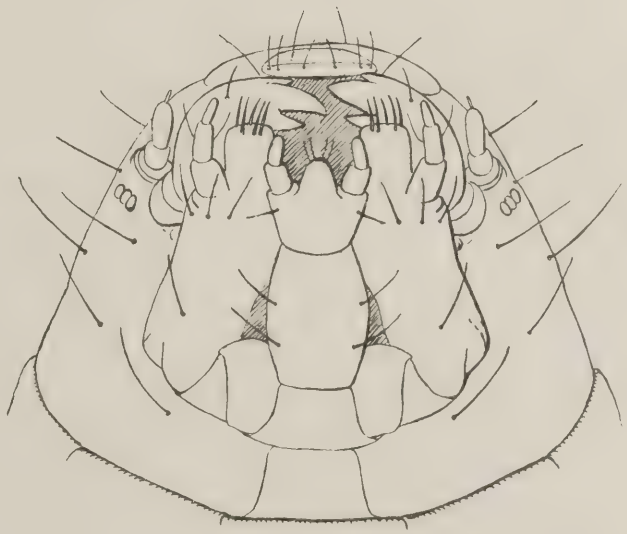


Fig. 17. *Pseudhadrus seriatus*, Larve: Kopf von unten, × circa 36.

neben der obersten Ocelle steht eine lange Borste, zwei weitere Borsten stehen weit auseinander im Nacken, je eine hinter den Fühlern auf der Stirn. Die Clypealsutur ist gerade, scharf ausgeprägt, hinter ihr stehen 2 Borsten, das Epistom ist gerade abgestutzt, die Oberlippe gross, beide haben je 2 Borsten. Weitere, längere Borsten stehen vereinzelt an den Seiten des Kopfes und an den Mandibeln, diese sind oben scharfkantig und stark mehrzähnig. Fühler 3-gliedrig, das letzte ist winzig klein, Stift-ähnlich, dem vorletzten gerade aufgesetzt. Die Mandibeln sind spitz, die rechte ist 3-zähnig, die linke 4-zähnig, auf der ersteren findet sich je ein Zahn oben und unten vor der Spitze, bei der letzteren 2 oben und einer unten. Die linke Mandibel hat einen langen, sehr hoch, scharfkantig begrenzten, konkaven Mahlzahn, die rechte einen gewölbten. Die Maxillen sind gross, schmal, am Ende abgestutzt und innen stark beborstet, die Borsten sind ziemlich lang, die Innenseite der Lade ist 2-zeilig beborstet. Die 3-gliedrigen Maxillarpalpen überragen mit den letzten $1\frac{1}{2}$ Gliedern das Ende der Maxillen, das letzte Glied ist das kleinste, aber nicht wesentlich schmaler und kürzer als das vorletzte.

Das *Vorderbrustsegment* ist querüber eingesattelt und in der Vertiefung mit kräftigen Punkten versehen, die Hinterecken sind scharf stumpfwinklig, ihnen nahe steht eine Gruppe von 3 langen Borsten, 3 weitere am Rande eben vor der Mitte, dann querüber einige andere. Mittel- und Hinterbrust haben an den Seiten je 2 Borsten.

Die ersten *Abdominalsegmente* haben ebenfalls an jeder Seite 2 Borsten, das drittletzte Segment ist oben fein und sparsam, das vorletzte sehr grob und dicht punktiert und leicht quer gerunzelt. Das letzte ist sehr auffallend: es hat oben einen wulstigen Rand, der in der Mitte tief gespalten ist. Dieser Spalt wird an seiner Ecke jederseits von einem Doppelzahn begrenzt, dessen kleinere Spitze weiter nach innen liegt. Weiter nach aussen auf dem Wulst findet sich ein Häkchen, dessen Spitze nach der Mitte zu gerichtet ist. An den Seiten steht eine gerade, etwas kammförmige Erhöhung, die oben und unten einen starken Endzahn trägt, der obere ist nach der Mitte zu gerichtet, der untere in entgegengesetzter Richtung gekrümmt. Oben auf dieser Erhabenheit steht eine lange Borste. Unten trägt das Segment 2 sehr lange Haken, die nach oben gerichtet sind, diese Haken haben auf der Oberseite nahe dem Grunde eine kleine, rundliche Schwiele und ebenfalls nahe dem Grunde, aber nach innen zu 2 starke Nebenzähne, deren Spitze schräg nach innen und hinten gerichtet ist. Am Grunde dieser Zähne befindet sich eine lange Borste, eine weitere innen am Haupthaken. Vor dem Wulst, am Vorderrande geht eine Querreihe grober Punkte über das Segment, einige andere grobe Punkte stehen am Absturz. Die Ventralseite des letzten Segmentes ist kräftig gewölbt und stark, nicht gedrängt punktiert.

Die *Beine* sind sämtlich gut entwickelt, an Grösse kaum von einander verschieden, alle Hüften sind sehr gross, ganz quer, Schenkel und Hüften an der Unterseite mit einer Reihe langer Borsten versehen; auch im übrigen sind gut entwickelte, aber nicht lange Borsten an den Beinen vorhanden. Am Ende befindet sich eine kräftige Klaue. Das Mesosternalstigma ist sehr gross, rund, die Abdominalstigmen sehr klein, fast kreisrund, schwach länglich und quer zur Längsachse des Körpers stehend. Die Abdominalplatten sind so breit wie lang, sehr schwach trapezisch.

Die Larve fand sich in vermodertem Holz, die Zucht einer 2. Exemplars ergab den Käfer.

Subfam. **Eutelinae.**

Pulposipes, Solier.

Pulposipes Sol. (scrips. *Polposipus*), Studi Ent. II. 1848, p. 154 (sep. p. 8), 260 (sep. p. 114). Lacord., Gen. Col. v. 1859, p. 357.

Syn. *Dysceladus* Wat., Ann. Mag. Nat. Hist. (4) xv. 1875, p. 411.

35. *Pulposipes herculeanus*, Solier, *loc. cit.*, p. 262 (116), t. 11, fig. 9—13. Lac., *loc. cit.*, 358, nota 1 (Pl. **23**, Fig. 1).

Syn. *tuberculatus*, Wat., *loc. cit.*, p. 412.

Die Entdeckung dieses hochinteressanten Käfers auf den Seychellen ist eine der schönsten der Seychellen-Expedition. Diese grösste Tenebrionide der Inselgruppen, eine der eigenartigsten Formen der so ungemein gestaltenreichen Familie, war bisher nur in 2 Stücken bekannt (ausser einem Bruchstück), von denen das eine der Typus der Gattung *Pulposipes* ist, das andere derjenige von *Dysceladus*. Ich habe weder den Typus der einen noch der andern Art gesehen*. Trotzdem gebe ich die oben angegebene Synonymie ohne Vorbehalt. Das Tier ist so charakteristisch, dass wohl kaum eine Verwechslung möglich ist.

Pulposipes herculeanus ist nach Solier in Bengalen beheimatet, *Dysceladus tuberculatus* nach Waterhouse auf Mauritius. In Bengalen ist die Art nie wieder aufgefunden worden und wird dort, denke ich, auch nie gefunden werden. Wie bei so manchem andern Tier ist auch bei diesem der Fundort falsch, die Art an und für sich selten, und so schleppt sich nun die Angabe aus der Originalbeschreibung aus einem Katalog in den andern fort. Erfreulicherweise gibt Solier eine ausführliche und gründliche Beschreibung, besonders auch der Mundteile, so dass kein Zweifel darüber bestehen kann, dass wir es mit eben dieser Art zu tun haben. Die m. E. sicher falsche Fundangabe hat nun das Erkennen der Art bisher unmöglich gemacht. Ja Lacordaire, dem das Tier fremd gewesen ist, und der eine Beschreibung nach Solier gibt, hält sogar das Tier für ein Artefakt. Seine Notiz ist von Interesse, und ich wiederhole sie hier (s. Lac., Gen. Col. v. 1859, p. 358 und nota 1): "En prenant connaissance de cette réunion insolite de caractères, je me suis demandé si Solier ne les avait pas rédigés d'après un insecte factice composé de pièces rapportées. Ces pièces seraient le prothorax et l'arrière-tronc d'un *Anomalipus*, auxquels on aurait ajusté des pattes de *Nyctobates* et une tête de quelque *Ulomide*."

Lacordaire hat, obgleich ihm die Art in Natur unbekannt war, nach Soliers guter Beschreibung die Stellung der Gattung bei den Eutelinen richtig erkannt. Sie unterscheidet sich von den Verwandten u.a. durch ganz anderen Fühlerbau, da die Antennen

[* I have seen the type of *Dysceladus tuberculatus*, Waterhouse, in the British Museum, and can vouch for the correctness of Herr Gebien's judgment in identifying the Seychelles material with that species. Besides Waterhouse's type from Round Island, Mauritius, there are in the British Museum 6 specimens from the Seychelles ex coll. Nevinson. These were purchased by Mr Nevinson from Mr O. E. Janson, who tells me that he got them from a traveller who collected miscellaneous objects. They are known to be from the Seychelles, but from which particular island is not recorded. Probably they also were from the small and outlying Frigate Island, the only one from which the Percy Sladen Trust Expedition obtained the insect. Some 14 examples were actually obtained by the Expedition, though, owing to the risk of sending them, only a small series was submitted to Herr Gebien. H. S.]

nicht mit starker Keule versehen sind. Ihr nächster, aber doch recht fern stehender Verwandter ist *Hyboproctus* Kolbe aus Ostafrika, von dem ich eine Anzahl neuer Arten besitze. *Pulposipes* unterscheidet sich scharf durch kurzen, fast bis zu den Augen in das Pronotum eingelassenen Kopf, flache, scharfkantige Wangen, verhältnissmässig flachen, aussen sehr scharfkantigen Thorax, ungekeulte Fühler, ganz andere Skulptur, die auf den Decken aus 4 Reihen grober Tuberkeln besteht.

Waterhouse' Beschreibung von *Dysceladus* kann nur bescheidenen Ansprüchen genügen, aber sie lässt ebenfalls unsere Art deutlich erkennen. Wenn er aber das Tier mit der amerikanischen Gattung *Coelocnemis* vergleicht, und es in seine Verwandtschaft bringt, so kann ich ihm nicht zustimmen, das Tier hat weder die geringste Ähnlichkeit mit *Coelocnemis*, noch stimmt es in den wesentlichen Merkmalen mit ihm überein. Ganz anders sind die Mundteile (die Mandibeln z. B. haben eine feine Querriefung, die aber bei *Coelocnemis* und den Verwandten fehlt), das Kinn ist flach gewölbt und nicht hoch gehöckert, die Epipleuren sind vollständig bei *Coelocnemis*, die Flügeldecken kaum untergeschlagen, die Kopffurche fehlt und der feinere Bau der Fühler ist ganz abweichend.

Wir geben, um auf das wunderbare Tier aufmerksam zu machen, eine neue Abbildung, da Solier's Bild mehr oder weniger ein Produkt seiner Phantasie ist.

Will man bei dieser ausgezeichneten und ziemlich isoliert stehenden Gattung Verwandtschaftsbeziehungen konstruieren, so muss man auf die afrikanischen Gattungen der Eutelinen zurückgreifen. Ostafrika hat in *Hyboproctus* und einer neuen Gattung einige Anklänge an unsere. Wir halten aber dafür, dass *Pulposipes* als endemisches, sehr altes Element unserer Spezialfauna anzusehen ist.

Mir liegen 5 Exemplare vor, deren Grösse 25—31·3 mm. variiert.

Loc. Seychellen: "found only in Frigate Island (1905 and 1908, Gardiner), under fallen dead leaves of coconut-palms." Waterhouse gibt an: Mauritius (Round Island).

Skulptur der Decken und des Pronotums sind variabel, die Zahl der Tuberkeln in den Reihen variiert von 5—12 Stück, die Grübchen auf dem Pronotum sind manchmal deutlicher, manchmal schwächer.

Subfam. **Heterotarsinae**.

Enicmosoma, nov. gen.

Sehr klein, geflügelt, von der Gestalt einer *Corticaria* oder einer andern Lathridiide. Körper sehr kurz und sparsam behaart.

Kopf gross, Augen nicht eingeschnürt, sehr stark, etwas konisch vorragend, grob fazettiert, die Wangen sind sehr dick, der Vorderkopf ist vor ihnen stark eingeschnürt. Oberlippe gross, frei, Fühler 10-gliedrig, Glied 1 und 2 sind gross, die folgenden sind viel kleiner und dünner, 3 ist $1\frac{1}{2}$ mal so lang wie 4, die beiden letzten Glieder bilden eine knopfförmige, stark abgesetzte Keule, 9 ist dreieckig, etwas länger als breit. Das Mentum ist trapezisch, flach, mit 2 länglichen, tiefen Grübchen versehen, die Ligula ist stark hornig, die Labialpalpen sind sehr klein, ihr Endglied ist zugespitzt. Die Mandibeln sind am Ende ausgeschnitten und 2-spitzig; das Endglied der Maxillarpalpen ist dreieckig.

Der *Halsschild* ist quer, mässig gewölbt, der Vorderrand gerade abgestutzt, der Seitenrand krenuliert, die Hinterecken sind schart. Das Schildchen ist deutlich.

Die *Flügeldecken* haben starke Schulterbeulen, sie sind nach hinten erweitert, unregelmässig punktiert, die Epipleuren sind vollständig, gegen das Ende nur wenig verschmälert.

Das *Prosternum* ist hinten gesenkt, die Vorderhüfthöhlen sind geschlossen, ebenso die mittleren, bei denen an den Seiten kein Trochantinus sichtbar ist. Das Mesosternum ist vorn nicht eingedrückt, sondern im Bogen gesenkt, der Abdominalfortsatz ist breit dreieckig, die Segmente nehmen nach hinten an Länge ab, die Gelenkhäute sind deutlich. Die Beine sind mässig lang, die Schenkel dick, Geschlechtsauszeichnungen an den Beinen sind bei 2 Arten vorhanden. Die Tarsen aller Beine haben ein zweilappiges vorletztes Glied, auf dessen Grund das letzte eingelenkt ist, das vorletzte ist nur wenig breiter als die vorhergehenden.

Diese Gattung hat grosse Ähnlichkeit mit dem amerikanischen *Paratenetus*, mit welchem *Lagriola* Kirsch identisch ist, sie unterscheidet sich aber scharf durch ganz andere Kopfbildung. Die stark buckelig aufgetriebenen Wangen liegen mit ihrer Aussenkante nicht mitten vor den Augen wie bei *Paratenetus*, sondern innen vor den Augen, so dass also diese den Seiten des Kopfes aufgesetzt sind. Ganz anders sind auch die Fühler, sie sind nicht 11- sondern 10-gliedrig und haben dementsprechend nicht eine 3- sondern eine 2-gliedrige Keule. Mit unserer neuen Gattung muss *Terametus* Motsch. vom Cap näher verwandt sein. Er soll aber nur 9-gliedrige Fühler haben, ferner sind die Augen klein, der Halsschild hat scharfe Vorderecken und ist an den Seiten fast gerade.

36. *Enicmosoma punctum*, nov. spec. (Tafel **23**, Fig. 16.)

Sehr klein, lang oval, matt glänzend gelbbraun oder gelblich.

Der *Kopf* ist lang gestreckt, die Stirn hat die Breite der Wangen, welche sich also nach hinten fast geradlinig am Innenrand der Augen fortsetzen. Diesen Seiten des Kopfs sind die stark vorragenden, etwas kegelförmigen Augen aufgesetzt, sie haben fast die halbe Breite der Stirn und sind vorn nicht durch die Wangen eingeengt, sie sind grob fazettiert, jedes Fazettchen ist kugelig gewölbt. Die Wangen sind dick wulstig, nach vorn stark eingezogen verengt. Vorn ist ein ziemlich kräftig vorgezogenes Epistom vorhanden, dessen Vorderrand halb so breit ist wie die Stirn hinten, es ist vorn nicht ausgerandet. Eine Quernaht fehlt, statt ihrer findet sich ein breiter, querer Eindruck. Die Punktierung ist wie die des Pronotums dicht und ziemlich grob. Die mittleren 6 Fühlerglieder sind dünn, Glied 1 und 2 dagegen dick, zylindrisch, 2 doppelt so lang wie dick, so lang wie 3, dieses viel dünner, 4—7 sind gleichlang, zylindrisch, länger als breit, 8 so lang wie breit, 9 ist viel grösser als 8, dreieckig, etwas schmäler als lang, 10 fast kugelig, die beiden letzten bilden eine knopfartige, lockere Keule.

Der *Halsschild* ist ungefähr $1\frac{1}{2}$ mal so breit wie lang, vor der Mitte am breitesten, er ist querüber kräftig und gleichmässig gewölbt und hat nur einen schmal abgesetzten Rand, der ungefähr 6 stumpfwinklige, aber scharfe Zähne zeigt. Der Vorderrand ist ganz gerade abgeschnitten, die Vorderecken sind ganz verrundet, die hinteren scharf stumpfwinklig, die Basis ist in gleichmässigem, nicht sehr starkem Bogen nach hinten gezogen und schliesst sich eng an die leicht ausgeschnittene Basis der Decken. Die Punktierung ist ziemlich grob und dicht, jeder Punkt hat ein anliegendes, ziemlich langes, weissliches Haar, die Haare sind fast alle von den Seiten her zur Mitte gerichtet.

Die *Flügeldecken* sind nach hinten erweitert, kräftig gewölbt, fallen aber zur Spitze lang ab. Die Seitenrandkante ist von oben ganz sichtbar, die Schultern sind verrundet, haben aber eine kräftige Schulterbeule. Die Punktierung ist wie die des Pronotums ziemlich grob, gleichmässig, ganz verworren, die Zwischenräume der Punkte sind ungefähr so gross wie diese. Jeder Punkt hat ein anliegendes, helles, nach hinten gerichtetes Haar, das ungefähr bis zum Grunde des folgenden reicht.

Die Skulptur und Behaarung der *Unterseite* gleicht derjenigen der Oberseite, nur das Prosternum ist noch gröber punktiert. Die Beine sind ziemlich lang, die Schienen leicht gekrümmt, eine Aussenendecke fehlt. Die Tarsen sind schlank, das Grundglied an den vorderen 2 Paaren ist kurz, an den hinteren lang, viel länger als das Klauenglied, dieses ist dünn, das vorletzte unten gelappt und oben tief ausgeschnitten, so dass das letzte am Grunde des vorletzten eingelenkt ist. Der Penis ist sehr dünn, einfach, lang.

L. 1·4—2 mm.

Loc. 25 Exemplare von den Seychellen. Silhouette: "Mare aux Cochons, plateau and forest above, ca. 1000 feet, viii.—ix. 1908 ; low coconut-planted country near the coast at Pointe Etienne, 17. ix. 1908. Mahé: country above Port Glaud, 500—1000 feet, xi. 1908, one specimen."

37. *Enicmosoma uncinatum*, n. sp.

Der vorigen Art so ähnlich, dass ich auf eine ausführliche Beschreibung verzichte. Meist hell gelbbraun, weisslich behaart. Die Augen sind nicht kegelförmig, sondern nur halbkugelig. Das 9. Fühlerglied ist an der Spitze etwas breiter als lang, die Haare des Halsschildes sind so lang, dass sie auch den folgenden Punkt überragen, die Punkte dagegen sind feiner. Der Rand ist fast glatt, selten mit schwacher Krenulierung versehen. Auch ist das Pronotum viel flacher als bei den beiden andern Arten. Das Mesosternum ist vorn dick und vollständig gerandet. Die Mittelschienen des Männchens sind innen vor dem Ende auf kurze Strecke schwach ausgeschnitten, und der innere Enddorn ist gebogen und sehr lang. Die Hinterschienen sind gegen das Ende schwach verbreitert, einfach; die Behaarung der Decken bildet deutliche Reihen.

L. 1·6—2 mm.

Loc. 37 Exemplare von der Insel Rodriguez, viii.—xi. 1918 (Snell und Thomasset).

Von der folgenden Art, welche, wie es scheint, mit ihr zusammen vorkommt, unterscheidet sich unsere sicher durch geringere Grösse, flachen, fast ganzrandigen Halsschild und viel feinere Skulptur, am meisten aber im männlichen Geschlecht durch die Beinbildung.

38. *Enicmosoma lathridioides*, n. sp.

Auch bei dieser Art ist keine ausführliche Beschreibung nötig. Die Färbung ist meist dunkelbraun, selten heller; die Augen sind ebenfalls halbkugelig, und das 9. Fühlerglied ist deutlich quer. Der Halsschild ist querüber stark gewölbt, sein Seitenrand ist wie bei *punctum* stark krenuliert. Die Behaarung der Flügeldecken liegt in allen Richtungen, bildet also keine deutlichen Reihen. Die Mittelschienen der ♂ haben keine verlängerten Enddornen, aber innen vor dem Ende einen kurzen, tiefen Ausschnitt, und das Ende selbst ist etwas hakenförmig nach innen gezogen. An den Hinterschienen des Männchens findet

sich vor dem Ende eine sehr stumpfe Ecke, weiter unten sind die Tibien parallelseitig und dort mit einigen sehr kurzen Stachelborsten versehen.

L. 1·9—2·3 mm.

Loc. 15 Exemplare von der Insel Rodriguez, viii.—xi. 1918 (Snell und Thomasset).

39. *Enicmosoma*, n. sp.

Ausser den 3 vorgenannten Arten liegt mir noch eine 4. in einem einzelnen ♀ vor. Ich muss leider darauf verzichten, auch diese zu beschreiben, weil ich vermute, dass auch bei dieser Art die wichtigen Unterscheidungsmerkmale an den Schienen der Männchen zu finden sind. Sie hat halbkugelige, nicht konische Augen, ist grösser (2·6 mm.) und hat einen flachen Halsschild mit nicht krenulierten Seiten.

Loc. "Seychelles. Praslin: from between leaf-bases of a growing Coco-de-Mer palm (*Lodoicea*) in the Vallée de Mai, 28. xi. 1908."

Die 3 Arten von Enicmosoma lassen sich folgendermassen unterscheiden.

1. Die Augen treten stark und konisch vor, Schienen des ♂ ohne Geschlechtsauszeichnung, 9. Fühlerglied etwas länger als breit, Halsschildrand krenuliert .....*punctum.*

Die Augen sind halbkugelig, Schienen des ♂ mit Geschlechtsauszeichnung, 9. Fühlerglied etwas breiter als lang .....2.

2. Pronotum querüber flach, Seitenrand glatt oder sehr schwach krenuliert, Skulptur fein. ♂: Mittelschienen mit stark vergrössertem, gekrümmten inneren Enddorn, Hinterschienen einfach .....*uncinatum.*

Pronotum querüber stark gewölbt, grob punktiert, sein Rand stark krenuliert. ♂: Mittelschienen innen vor dem Ende mit kurzer Ausbuchtung, das Ende selbst vorgezogen; Hinterschienen zur Spitze schwach verdickt, dann parallel und dort mit einigen kurzen Stachelborsten.....*lathridioides.*

Subfam. **Cnodaloninae.**

40. *Nov. gen., nov. spec.*

Von der Insel Silhouette ("near Mont Pot-à-eau, over 1000 feet") liegt mir ein Einzelstück einer interessanten Gattung vor, die ich für neu halten möchte. Ich ziehe er aber vor, auf eine Beschreibung zu verzichten, da mir zu viele der besonders von Fairmaire beschriebenen madegassischen Cnodaloninen-Gattungen unbekannt geblieben sind. Ferner ist noch niemals versucht worden, die Cnodaloninen im Zusammenhang darzustellen. Eine Einreihung in ein erst zu begründendes System wäre also ganz problematisch.

Mahena, nov. gen. aff. *Eucyrtus*, sens. lat.

Klein, kurz elliptisch, ungefähr von der Gestalt eines *Platydema*, nackt, geflügelt, metallisch.

Der *Kopf* ist flach, Quer- und Stirnfurchen fehlen, die Clypealsutur ist nur als feine, blanke Linie erkennbar. Die Augen sind gross, quer, zum Teil vom Vorderrand des Pronotums verdeckt, der Vorderkopf ist stark entwickelt, ungefähr halbkreisförmig, die Wangen sind viel schmaler als die Augen. Das Epistom ist nicht ausgerandet, die Oberlippe hat vorn einen leichten Querwulst. Die Fühler sind kurz und dick, vom 5. Gliede an keulenförmig erweitert, die vorletzten Glieder sind kräftig quer. Eine Gelenkhaut

zwischen Oberlippe und Epistom ist nicht sichtbar. Das Mentum fällt jederseits dachförmig ab, und hat einen scharfen Mittelkiel, es ist jederseits tief gefurcht, das Endglied der Maxillarpalpen ist schwach beilförmig.

Das *Pronotum* ist quer, an den Seiten scharf gekantet, die Basis ist ganz ungerandet, die Seiten von der Basis an nach vorn verengt, die Vorderecken verrundet, die hinteren stumpfwinklig. Das Schildchen ist gleichseitig dreieckig.

Die *Flügeldecken* sind stark gewölbt, nicht gebuckelt, die Seiten fallen senkrecht ab, die Oberfläche ist tief punktiert-gestreift, der 8. Zwischenraum nicht ausgezeichnet. Die Epipleuren sind hinten verkürzt, vorn scharfkantig, breit, innen neben der Hinterbrust scharf, aber fein gerandet.

Das *Prosternum* ist wagerecht, nach vorn nur ganz leicht gesenkt, dort gekielt, am Vorderrand scharf gerandet, der Fortsatz ist breit, das Mesosternum hat vorn nur einen winzigen, kurzen Ausschnitt, stürzt aber tief senkrecht ab, ist sogar nach unten hin etwas zurückgezogen. Die Propleuren sind deutlich ausgehöhlt. Das Metasternum ist mässig lang, die Furche hinter den Mittelhüften und die Abdominalfurche hinter den Hinterhüften sind sehr scharf und weit vom Rande entfernt. Die Gelenkhaut zwischen den letzten Segmenten ist deutlich, der Abdominalfortsatz gewinkelt.

Die sehr kurzen Beine haben keine Auszeichnung; die Schenkel sind unten scharf doppelkantig, die Schienen stielrund, die Tarsen normal, die ersten Glieder der vorderen sehr klein, dicht gedrängt, das Klauenglied aller Füsse ist verlängert, das vorletzte nicht ausgeschnitten oder gelappt.

Diese Gattung ist ebenfalls als endemisches Element der Seychellen zu betrachten. Ich sehe keine nähere Verwandtschaft mit den madegassischen Tenebrioniden, von denen mir allerdings mehrere Gattungen unbekannt geblieben sind. Die Beschreibung dieser Gattungen ist meist ganz ungenügend und berücksichtigt die wichtigen Merkmale nicht. Als ein Charakter von hervorragendem Wert bei der Einteilung der Cnodaloninen scheint mir die Bildung der Epipleuren gelten zu müssen, die neben dem Metasternum entweder gerandet oder ungerandet sind. Ich finde dieses Merkmal aber nirgend erwähnt. Bei den zahlreichen madegassischen Cnodaloninengattungen meiner Sammlung finde ich gerandete Epipleuren nur bei *Drocleana*, die aber mit unserer Gattung nicht die geringste Ähnlichkeit hat und allein schon durch die bedeutende Grösse auffällt. Auch bei den indischen und papuanischen Cnodaloninen sind gerandete Epipleuren ziemlich selten, finden sich aber bei *Thesilea*, *Agymnonyx*, ferner bei zahlreichen Arten der Gattung *Eucyrtus* im gegenwärtigen Umfang. Diese Gattung enthält aber die heterogensten Arten und bedarf wie keine andere der Tenebrioniden der Revision. Sie muss in mindestens 10 Gattungen aufgeteilt werden. Die Randung findet sich da bei allen kurzköpfigen Arten, sie ist selten bei den kleinen Arten, ist aber vorhanden bei *Euc. neomedinus* Fairm. Und dies ist die Art, mit welcher unsere Gattung am meisten Übereinstimmung zeigt. Doch möchte ich nicht von einer nahen Verwandtschaft sprechen. Die Bildung der Brust, besonders des Mesosternums, die an den Rand gerückte Furche des Metasternums und des Abdomens, verbieten eine Vereinigung beider Arten in eine Gattung. Im übrigen findet sich bei beiden eine auffallende Übereinstimmung. Von den madegassischen Gattungen unterscheidet sich unsere übrigens auch durch den weder mit Stirn- noch Querfurche versehenen Kopf.

41. *Mahena cuprea*, n. sp.

(Tafel **23**, Fig. 10.)

Klein, elliptisch, stark, aber nicht buckelig gewölbt, die ganze Oberseite bräunlich kupfrig, Unterseite, Fühler und Beine schwarz.

Der *Kopf* ist flach, die Quernaht nur leicht angedeutet; die Augen sind quer, treten aber an den Seiten nicht stark hervor, die Stirn zwischen ihnen ist ungefähr doppelt so breit wie ein Auge. Der Abstand des Vorderrandes der Augen vom Epistom ist ungefähr so gross wie die Breite eines Auges von vorn nach hinten. Die Punktierung ist fein und ziemlich dicht, der Vorderkopf ist etwa halbkreisförmig, doch bis zu den Augen nach hinten erweitert, dort also nicht parallel. Das Epistom hat weder Ecken noch Ausschnitt. Die Fühler erreichen kaum die Mitte des Pronotums, Glied 3 und 4 sind an Grösse wenig verschieden, fast zylindrisch, 5 und die folgenden so breit wie lang, die vorletzten ungefähr $1\frac{1}{2}$ mal so breit wie lang.

Das *Pronotum* ist an der Basis etwa $2\frac{1}{2}$ mal so breit wie in der Mittellinie lang, hinten am breitesten; die Vorderecken ragen nicht vor, sondern sind verrundet, die Mitte des Vorderrandes ist fast gerade, die Randlinie dort nur an den Seiten deutlich, die Hinterecken sind stumpf, nur der Mittellappen der Basis ist kräftig und breit vorgezogen. Die Seitenrandkehle ist stark, die Punktierung zwar fein, aber sehr deutlich, wenig eng.

Die *Flügeldecken* sind zwar stark gewölbt, doch ist die Seitenrandkante von oben der ganzen Länge nach sichtbar. Es sind starke Punktstreifen vorhanden, die besonders nach hinten noch mehr vertieft sind. Die Zwischenräume sind vorn schwächer, hinten stark gewölbt, ebenso grob wie der Halsschild punktiert. Die Punkte der Streifen sind fein, durch eine eingeschnittene Linie miteinander verbunden.

Das *Prosternum* ist nur vorn in der Mitte deutlich punktiert, der Fortsatz leicht doppelfurchig. Die vordere Furche der Hinterbrust und des Abdomens, richtiger der flache Raum zwischen der Furche und der Vorderkante, ist grob längsfaltig; die ersten Abdominalsegmente sind an den Seiten stark punktiert und längsgestrichelt. Die Schenkel sind so kurz, dass sie in keiner Richtung über den Körperrand hinausragen. Schenkel und Schienen sind kaum wahrnehmbar punktiert.

L. 4·4—4·6 mm.; Br. 2·4 mm.

Loc. Seychellen. Mahé: Cascade Estate, ca. 1000′; höchster Wald von Morne Blanc, 24. x. 1908.

3 Exemplare.

Wie schon in der Gattungsbeschreibung gesagt, sieht die Art einem kleinen *Platydema* ähnlich, doch zeigen Kopf- und Brustbildung, dass wir es mit einer kleinen Cnodalonine zu tun haben.

Subfam. **Helopinae.**

Camarothelops, Kolbe, Mitt. Zool. Mus. Berlin, v. 1910, p. 30.

Über die zoogeographischen Beziehungen dieser Gattung habe ich schon in der Einleitung berichtet. Kolbes Beschreibung sind noch einige wesentliche Merkmale hinzuzufügen: die Gelenkhaut des Epistoms ist nicht oder sehr undeutlich sichtbar, eine

Querfurche auf dem Kopf fehlt, die Augen sind sehr klein, ganz an den Seiten des Kopfes gelegen, die Fühler haben eine 4-gliedrige Keule; der Halsschild ist entweder hinten ganz flach (*C. scotti*) oder wie bei *Sphaerotus* stark gewölbt; Flügeldecken mit tiefen Punktstreifen, die Epipleuren vor der Spitze stark verkürzt, ihre Kante innen bis zum Schwinden sehr scharf, nicht wie bei *Sphaerotus* nach hinten verstreichend. Das Metasternum hat hinten eine sehr tiefe, lochartige, stark behaarte Grube, die ein Exudat ausscheidet. Die Tarsen sind verbreitert, alle Glieder stark quer, vorn ausgeschnitten, das letzte ist am Grunde des vorletzten eingelenkt, dieses schiebt sich also unter das letzte.

42. *Camarothelops braueri*, Kolbe.

(Tafel **23**, Fig. 3, 4; Textfig. 18, 19.)

Kolbe, Mitt. Zool. Mus. Berlin, v. 1910, p. 31.

Ausser den beiden Originalexemplaren von Mahé und Silhouette, die Brauer sammelte, und die dem Berliner Museum gehören, liegen mir jetzt ca. 70 Tiere vor, die wenig Veränderlichkeit zeigen. Äusserlich sichtbare Geschlechtsunterschiede scheinen zu fehlen.

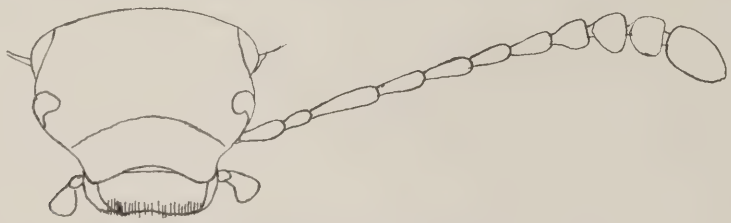


Fig. 18. *Camarothelops braueri*, Kopf, × 20.

Fig. 19. *Camarothelops braueri*: *a*, Vorderfuss von oben; *b*, Hinterfuss von der Seite gesehen; × 35.

Dr Hugh Scott gibt folgende biologische Notiz: "This species was often shaken from fallen dead leaves of *Stevensonia*-palm in the drier parts of the forest."

Loc. Mahé: nahe Morne Blanc, ca. 1000′, xi. 1908; "high forest of Morne Blanc and Pilot, xi. 1908; Cascade Estate, about 1000′; Mare aux Cochons district, 26. i.—2. ii. 1909." Silhouette: "got by beating in open jungle-country, 3. viii. 1908; Mare aux Cochons (ix. 1908) and forest just above; shaken from fallen palm leaves in secondary forest, ix. 1908."

43. *Camarothelops scotti*, n. sp.

(Tafel **23**, Fig. 5.)

Glänzend schwarz, die Fühler bis auf die letzten Glieder und die Füsse gelbrot.

Der *Kopf* ist flach, eine Quernaht ist leicht angedeutet, aber nicht eingedrückt oder eingeschnitten, die Wangen sind hinten parallelseitig, schmaler als die Augen, der Vorderkopf ist lang und geradlinig verengt, nicht wie bei voriger Art leicht eingezogen, das Epistom in breitem Bogen stark ausgeschnitten, seine Ecken sind kurz verrundet rechtwinklig. Die Augen sind oben sehr klein, fast kreisrund. Die Punktierung ist tief, mässig fein, nicht eng, gleichmässig. Die Fühler sind ziemlich lang, am Grunde dünn, Glied 3 ist doppelt so lang wie 2, 3—6 sind zylindrisch, 4 noch $2\frac{1}{2}$ mal so lang wie dick, 8 ist dreieckig, so breit wie lang, die beiden folgenden sind quer. Das Mentum ist stark quer, ganz flach und hat einen sehr langen, häutigen Teil. Die Mandibeln sind am Ende tief gespalten.

Der *Halsschild* ist auffallend gestaltet, ganz abweichend von allen Misolampiden-Gattungen, er ist hinten ganz flach, die Seitenrandkante ist von oben breit sichtbar, die grösste Breite liegt hinten, nur das letzte Viertel ist zur Basis kräftig verengt, Hinter- und Vorderecken liegen in einer Linie, die Mittellinie ist so lang wie die Basis zwischen den Hinterecken, die Vorderecken sind etwas prononziert, aber kurz verrundet, die Spitze nur ganz leicht vorgezogen, die Basis ist in breitem Bogen ausgeschnitten, vor ihr befindet sich ein flacher, querer Eindruck; die Punktierung ist kräftig, aber nicht grob, nicht sehr eng.

Die *Flügeldecken* sind tief gefurcht, von der Basis bis zur Spitze, daher sind die Zwischenräume stark gewölbt, diese sind deutlich, wenn auch feiner als der Halsschild punktiert. Die Punkte der Streifen stehen nicht eng, sie sind gross, rund. Die an der Basis vereinigten Streifen 1 und 2, 3 und 4 sind dort lochartig vertieft, der letzte Streifen liegt auf dem umgeschlagenen Teil der Decken.

Das *Prosternum* ist in einen dicken, ziemlich langen Fortsatz ausgezogen und hinten mit seichter Grube versehen. Das Mesosternum ist vorn nicht eingedrückt, sondern mit schmaler, dicker, dem Metasternum anliegender Zunge versehen. Die Hinterbrust ist vorn gewölbt und hat hinten eine tiefe, lochartige Grube, die unten sehr dicht, lang behaart ist, die Haare sind zentral gerichtet. Das Abdomen ist sehr fein, weitläufig punktiert und mikroskopisch fein, anliegend, sparsam behaart. Die Tarsen sind in der Gattungsbeschreibung gekennzeichnet, das erste Glied hat eine filzig behaarte, die andern eine schwammige Sohle.

L. 7·5—8·3 mm.; Br. 3·7—4·1 mm.

Loc. 2 Exemplare von den Seychellen. Praslin: "Côtes d'Or Estate, from Coco-de-Mer forest in the Vallée de Mai, xi. 1908."

Von der vorigen Art durch den hinten ganz flachen Halsschild mit ausgerandeter Basis, geradlinig verengtes Epistom, durch tief gefurchte Flügeldecken mit lochartiger Verbindung der ersten Streifen weit verschieden. Bei *C. braueri* werden die Streifen vorn feiner und laufen tot aus.

GNATHELOPS, nov. gen.

Von der Gestalt vieler kleiner europäischer *Helops*-Arten, z. B. *consentaneus, pygmaeus*, mehr noch einem kleinen *Harpalus* ähnlich und besonders einer kleinen *Amara aulica*. Geflügelt, nackt, parallelseitig.

Der *Kopf* (s. Fig. 20) ist sehr gross, die Augen sind stark quer und ragen kräftig aus der Wölbung des Kopfes, sie werden von den Wangen wenig eingeengt. Diese sind schmaler als die Augen, leicht aufgebogen, Augenfurchen und -falten fehlen. Das Epistom ist lang, gerade abgeschnitten; die Oberlippe ist sehr gross, so breit wie lang, ungekielt, nicht mit einer sichtbaren Gelenkhaut versehen. Auch die Mandibeln sind ausserordentlich stark entwickelt, oben platt und breit und dort mit einer geschwungenen Furche versehen. Ihre Aussenseite ist tief eingedrückt und hat überstehende, sehr scharfe Ober- und Unterkanten, die Spitze, wie überhaupt die ganze Innenseite, ist dünn, kurz geteilt, die untere Spitze kleiner; der Mahlzahn ist sehr schmal, höchst fein quergerieft. Das Mentum (s. Fig. 21*a*) ist stark quer, jederseits tief grubig eingedrückt, die Vorderecken sind spitz dornförmig zur

Fig. 20. *Gnathelops chatanayi*, Kopf, × ca. 36.

Fig. 21. *Gnathelops chatanayi*: *a*, Ligula, × 60; *b*, Maxille, × 60; *c*, Vorderfuss von oben, × 40; *d*, Hinterfuss von der Seite gesehen.

Seite ausgezogen und schleifen sich an der Innenlade der Maxillen. Zwischen Mentum und Ligula befindet sich ein langer, verhältnismässig dünner, häutiger Teil. Die Ligula selbst ist sehr stark quer, trapezförmig, mindestens 4 mal so breit wie lang, die Seitenlappen verrundet flügelartig und ganz flach. Die zarten Labialpalpen sind am Grunde recht weit auseinander gerückt. Die Innenlade der Maxillen (s. Fig. 21*b*) ist normal, die äussere hat ein sonderbares, stark in die Quere gezogenes, riesiges Endglied, das auf einem dünnen Stiele sitzt und auf der Innenseite sehr dicht mit Sinnesporen besetzt, daher matt ist; die Innenlade hat keinen Hornhaken. Das Submentum ist tief quer gefurcht, die Kehle stark gewölbt, spiegelblank. Die Fühler sind fadenförmig, sehr lang, Glied 3 ist verlängert, die letzten 4 Glieder sind viel grösser (länger und dicker) als die vorhergehenden, aber gestreckt.

Der *Halsschild* ist quer, an den Seiten sehr stark gerundet, Vorderecken fehlen, die hinteren sind gut ausgeprägt, die Seitenrandkante ist scharf, die Basis gerandet, sehr schwach doppelbuchtig. Das Schildchen ist ungefähr halbkreisförmig.

Die *Flügeldecken* sind fast parallelseitig, mit deutlicher Schulterbeule versehen, sie sind gestreift-punktiert, die Epipleuren sind sehr schmal, bis zur Spitze entwickelt.

Das *Prosternum* ist vorn scharf gerandet, die Vorderhüfthöhlen sind geschlossen, der Fortsatz ist ganz abschüssig. Das Mesosternum ist niedergedrückt, vorn mit kräftigem Eindruck versehen, aber ohne Ecken. Das Metasternum ist lang, der Abdominalfortsatz gewinkelt, die Gelenkhaut an den Segmenten sehr deutlich. Die Beine sind lang, die Schenkel kräftig gekeult, unten ohne Kanten, die Tibien gerade, rund, dünn, die vorderen mit Aussenendecke, die Enddornen sehr undeutlich. Die Tarsen (s. Fig. 21*c*, *d*) sind bei dem toten Tier auffällig nach oben gekrümmt und sehr charakteristisch: Glied 1 ist länger als breit, die folgenden blattförmig, nach unten ausgezogen, also jedes Glied oben am vorhergehenden eingelenkt, der untere Lappen etwas verdickt und mit schwammiger Sohle versehen; auch das Ende des Klauengliedes mit Schwammpolster, dieses Glied ist aber am Grunde dünn. Dies äusserste Ende des Klauengliedes ist oben ganz kurz stielförmig ausgezogen, an diesem Stielchen sitzen die ungemein zarten, ganz zur Seite gerichteten Klauen.

Diese auf den Seychellen endemische Gattung ist sehr stark spezialisiert. Die höchst sonderbare Bildung aller Mundteile hat meines Wissens unter den Tenebrioniden nirgend ihresgleichen. Auch die Tarsen sind auffällig gestaltet, aber im allgemeinen derjenigen der madegassischen Gattung *Athrodactyla* sehr ähnlich. Doch ist *Gnathelops* mit diesem Genus nicht verwandt. Verwandtschaftsbeziehungen zu irgend einer andern Gattung scheinen überhaupt zu fehlen. Die Stellung von *Gnathelops* ist also nicht genau festzulegen. Wegen der rein äusserlichen Ähnlichkeit mag die Gattung einstweilen in der Nähe von *Helops* stehen.

44. *Gnathelops chatanayi*, n. sp.

(Tafel **23**, Fig. 7, 8; Textfig. 20, 21.)

Ziemlich parallelseitig, in der Längsrichtung fast flach, nackt, glänzend schwarz mit deutlichem Metallschein, oft die Naht oder ein länglicher Sattel auf den Decken rotbraun, Beine und Fühler gelb, nur die letzten 4 Glieder der letzteren schwarz.

Der *Kopf* ist ziemlich flach, die Stirn zwischen den Augen fast doppelt so breit wie ein Auge von oben gesehen; die Quernaht ist kräftig eingedrückt, aber nicht eingeschnitten. Das Epistom ist am Vorderrand so breit wie die Stirn zwischen den Augen, seine Ecken sind deutlich. Die Punktierung ist sehr dicht, fein, aber deutlich. Die Fühler sind fadenförmig, die Glieder fast sämtlich zylindrisch, einzeln gegen die Spitze leicht verdickt, die letzten 4 sind wesentlich breiter und länger als die vorhergehenden, $1\frac{1}{2}$ mal so lang wie breit.

Der *Halsschild* hat an der breitesten Stelle die Breite der Flügeldecken, seine Seiten sind sehr stark gerundet, vor der Mitte am breitesten. Vorderecken fehlen, die Randkante ist leicht gewellt, hinter der Mitte stark eingezogen verengt, sodass die Hinterecken fast rechtwinklig sind. Die Basis ist vollständig gerandet, an ihr befindet sich jederseits ein

rundliches, flaches Grübchen. Die quere Wölbung ist stark, allerdings nur vorn, der Vorderrand ist in breitem Bogen flach vorgezogen, die Basis fast gerade abgeschnitten; die Punktierung ist sehr dicht und deutlich, ziemlich gleichmässig.

Die *Flügeldecken* sind nach hinten schwach erweitert, die Seitenrandkante ist von oben gerade noch sichtbar. Es sind ziemlich feine Punktstreifen vorhanden: beim grösseren ♀ sind die inneren nur feine Punktlinien, d. h. stehen nicht vertieft, und die inneren Zwischenräume sind flach, nach aussen werden die Punkte der Streifen wesentlich gröber, besonders beim kleineren ♂; starke Punkte stehen in der Seitenrandkehle.

Das *Prosternum* ist vor den Hüften und an den Seiten grob und dicht punktiert, doch sind die nicht eingedrückten breiten Ränder der Propleuren glatt und nur unter dem Mikroskop fein lederrunzlig, auch der Raum unmittelbar neben den Hüften ist glatt, der punktierte Zwischenraum zwischen Rand und Hüfte ist längsrunzlig. Das Prosternum fällt dicht hinter den Hüften tief und senkrecht ab. Das Abdomen ist an den Seiten schwach und undeutlich längsrunzlig, der Seitenrand der ersten 3 Segmente hat eine feine Randlinie. Der Penis ist nadelförmig, sehr lang, zart, spitz, schwach gekrümmt. Die Tarsen der Vorderfüsse sind normal, das erste Glied ist klein, nicht breiter als die folgenden.

L. 3·7—6·5 mm.; Br. 1·3—2·6 mm.

89 Exemplare dieses ungemeinen zarten, zerbrechlichen Tieres.

Loc. Seychellen. Silhouette: "beaten from house-thatch made of palm leaves, and from leaves of growing *Stevensonia*-palms, etc., at the marshy plateau of Mare aux Cochons, about 1000′, and in various parts of the forests above, viii.—ix. 1908."

Var. *pallidus*, nov.

Auf der Insel Mahé findet sich ein Form, die gleichmässig gelblich-braun ist, nur die letzten 4 Fühlerglieder sind schwarz. Ich kann nicht annehmen, dass diese Form nur unausgefärbte Stücke umfasst, da das Chitinskelett vollkommen erhärtet ist, und da ausserdem diese Varietät zu verschiedenen Zeiten gefunden wurde. (Die Stücke waren unter 10 verschiedenen Nummern vertreten.)

Loc. Mahé: "from near Morne Blanc, x. 1908; high forest of Morne Blanc, 24. x. 1908; country above Port Glaud, above 500—1000′, 5. xi. 1908; Cascade Estate, forest 1000—2000′, ii.—iii. 1909; Morne Seychellois, over 1500′, 4. ii. 1909."

29 Exemplare.

Subspec. *pedestris*, nov. Eine 3. Form, von der mir leider nur 3 Exemplare vorliegen (♂) (die ♂ sind bei unserer Art kleiner, gröber punktiert, aber im übrigen nicht verschieden), scheint auf Praslin beschränkt zu sein. Sie ist möglicherweise gute Art, denn das kräftig vergrösserte (längere und breitere) erste Glied der Vordertarsen unterscheidet diese Form scharf. Die Färbung ist die der Stammform.

Loc. Praslin: "Côtes d'Or Estate, from Coco-de-Mer forest in the Vallée de Mai, xi. 1908."

Ich benenne unsere Art, eine der eigenartigsten der Seychellenfauna zu Ehren des hochbegabten, gewissenhaften und scharfsichtigen französischen Entomologen T. Chatanay, dessen Spezialstudium die Tenebrioniden waren, und dem wir einige ausgezeichnete kleine Arbeiten verdanken. Auch er wurde ein Opfer des unglückseligen Krieges.

Subfam. **Amarygminae.**

45. *Amarygmus seychellensis*, n. sp.

(Tafel **23**, Fig. 15; Textfig. 22.)

Ziemlich schmal oval, in der Längsrichtung stark gewölbt, klein, Oberseite einfarbig, schwach glänzend bräunlich grün bronzefarben, Unterseite schwarz, Fühler und Beine glänzend schwarzbraun oder schwarz.

Der *Kopf* (s. Fig. 22) ist sehr flach, die Wangen sind winzig klein und unauffällig, sie lassen den Gelenkkopf des Grundgliedes der Fühler breit sichtbar; die Stirn zwischen den

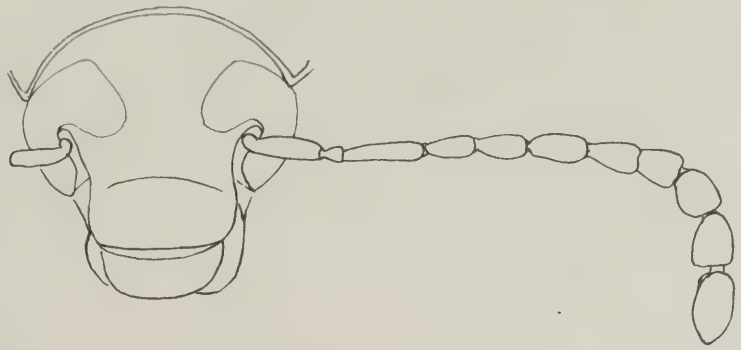


Fig. 22. *Amarygmus seychellensis*, Kopf, × 36.

Augen ist so breit oder etwas breiter als das 3. Fühlerglied lang. Der Vorderkopf ist in eine lange Schnauze ausgezogen, die Quernaht gerade, gut ausgeprägt, aber nicht eingeschnitten. Die Punktierung ist dicht und sehr deutlich, etwas rauh. Die Fühler sind dünn, gut gegliedert, Glied 1 ist fast so lang wie 3, aber wesentlich dicker, 3 ist etwas kürzer als 4 und 5 zusammen, diese beiden sind reichlich $1\frac{1}{2}$ mal so lang wie dick, 6 ist länger als 4 oder 5, auch länger als die folgenden Glieder, 7—10 sind nur wenig länger als dick, schwach zylindro-konisch, 11 ist gestreckt.

Der *Halsschild* ist verhältnismässig lang, von der Basis an stark nach vorn verengt, die Seitenrandkante ist von oben nicht sichtbar. Die Basis ist nur wenig mehr als doppelt so lang wie die Mittellinie, die Spitze ist vollständig gerandet, die Ecken sind in der Randkante kurz verrundet rechtwinklig. Die Punktierung ist ziemlich dicht und deutlich, aber fein, der Grund mikroskopisch fein lederrunzlig.

Die *Flügeldecken* sind in regelmässigem, sehr starkem Bogen gewölbt, hinten hoch und steil abschüssig, die Seitenrandkante ist überwölbt. Es sind Reihen kräftiger Punkte vorhanden, die besonders in der Endhälfte durch eine feine, eingeschnittene Linie miteinander verbunden sind, die Zwischenräume sind fast flach, sehr fein punktiert und äusserst fein lederrunzlig, daher etwas matt.

Das *Prosternum* ist sehr kurz, hinten breit und flach doppelfurchig, die Episternen der Hinterbrust sind nicht parallel, sondern nach hinten kräftig verbreitert. Die Vorderrandfurche des Metasternums und die des Abdomens hinter den Hüften sind tief, scharf und durch grobe Punkte uneben. Das Abdomen ist an den Seiten fein, oberflächlich und dicht längsgestrichelt. Die Epipleuren sind neben dem Metasternum mit feiner, aber scharfer und punktierter Randlinie versehen. Die Beine sind sehr dünn, die Hinterschienen

leicht gekrümmt, an den sehr zarten, langen Hintertarsen ist Glied 1 länger als die andern Glieder zusammen.

L. 4·3—5·1 mm.

Loc. "Seychelles: Silhouette, Mahé. Silhouette: about 50 examples were taken at the Mare aux Cochons plateau, about 1000 feet, ix. 1908; they were found only at night, crawling on the bark of growing bread-fruit trees (*Artocarpus incisa*) and Jack-fruit trees (*Artocarpus integrifolia*). Mahé: only two or three specimens were obtained, at Cascade Estate, about 1000 feet, i. 1909; there is no record as to how these were found."

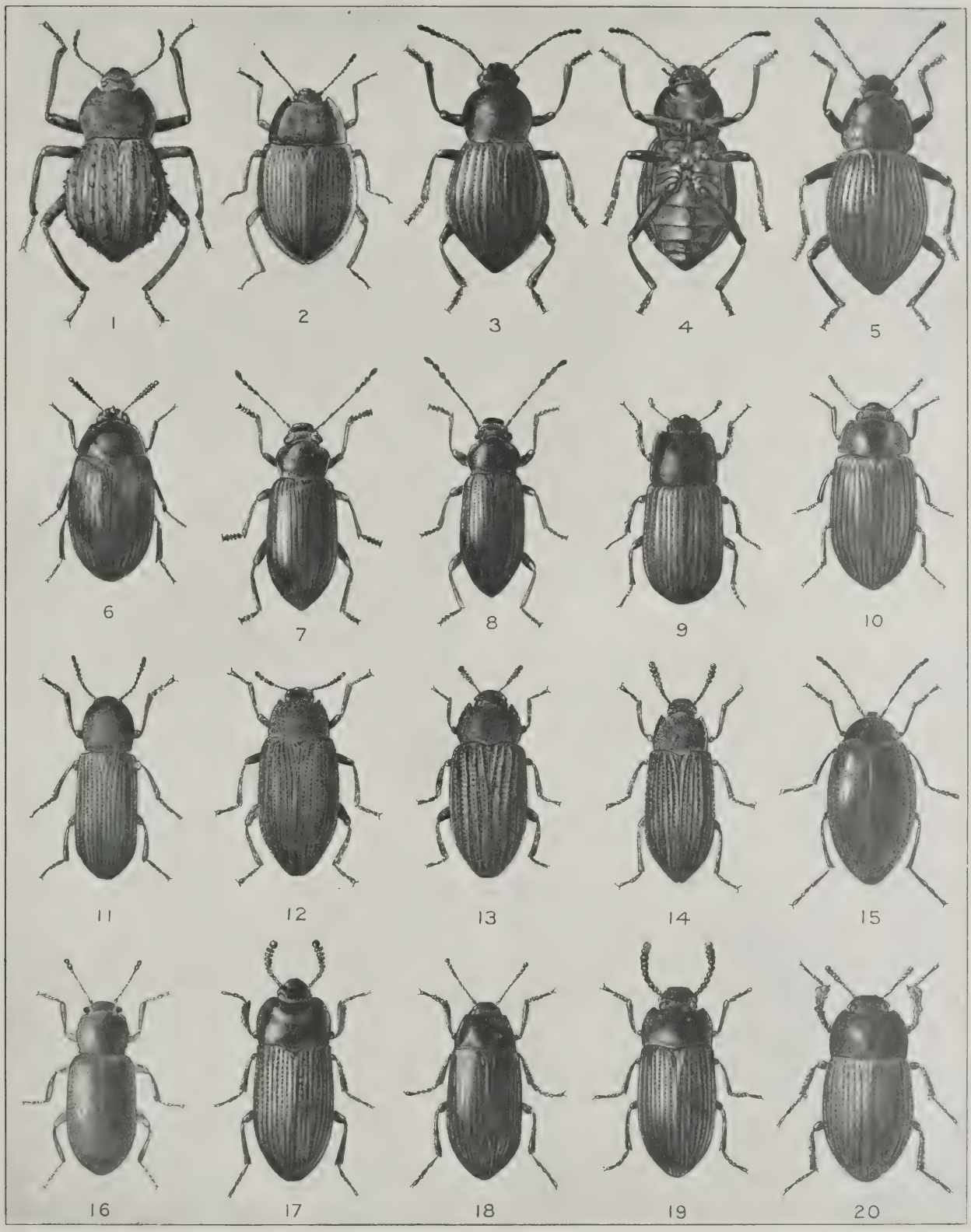
Diese Art ist einer Anzahl indo-malayischer sehr ähnlich, aber ich habe vergeblich versucht, diese letzteren zu bestimmen. Die Beschreibungen von Fairmaire lassen immer wieder Zweifel. Ich besitze eine sehr ähnliche Art von Java, die ich für neu halten muss. Von dieser unterscheidet sie sich durch grob punktierte Furchen der Unterseite, andere Fühler, und andere Deckenskulptur. Die Arten von *Amarygmus*, die von Madagaskar beschrieben wurden, sind mir leider unbekannt geblieben. Ihre Beschreibung ist sehr dürftig. Sie können aber mit unserer Art nicht verwechselt werden. *A. cuproaeneus* und *funerarius* sind sehr viel grösser, 12 resp. 11 mm. lang, anders gefärbt und skulptiert. *A. tarsatus* ist 7 mm. lang, blau, mit roten Tarsen, tiefer Querfurche des Kopfes versehen, die Hintertarsen sind kompress, die vorderen breit. Wegen dieses Merkmales gehört die Art möglicherweise zur Gattung *Platolenes*.

ERKLÄRUNG DER TAFEL 23.

Fig. 1. *Pulposipes herculeanus*, Solier, × 1.
Fig. 2. *Pseudhadrus seriatus*, Kolbe, × 2.
Fig. 3. *Camarothelops braueri*, Kolbe, × 4.
Fig. 4. *Camarothelops braueri*, Kolbe, Unterseite, × 4.
Fig. 5. *Camarothelops scotti*, sp. nov., × 5.
Fig. 6. *Platydema inaequidens*, Fairmaire, subsp. *seychellarum*, nov., × 7.
Fig. 7. *Gnathelops chatanayi*, gen. et sp. nov., × 6.
Fig. 8. *Gnathelops chatanayi*, gen. et sp. nov., ein kleineres Exemplar, × 7.
Fig. 9. *Tagalus cavifrons*, Fairmaire, × 8.
Fig. 10. *Mahena cuprea*, gen. et sp. nov., × 6.
Fig. 11. *Cylindrosia foveifrons*, gen. et sp. nov., × 6.
Fig. 12. *Bradymerus seychellensis*, sp. nov., × 4.
Fig. 13. *Bradymerus scotti*, sp. nov., × 5.
Fig. 14. *Bradymerus aspericollis*, Fairmaire, × 4.
Fig. 15. *Amarygmus seychellensis*, sp. nov., × 6.
Fig. 16. *Enicmosoma punctum*, gen. et sp. nov., × 15.
Fig. 17. *Uloma crenatostriata*, Fairmaire, × 4.
Fig. 18. *Diphyrrhynchus fryeri*, sp. nov., × 5.
Fig. 19. *Alphitobius crenatus*, Klug, × 5.
Fig. 20. *Plesioderes madagascariensis*, Mulsant, × 7.

[By an oversight the two examples of *Gnathelops chatanayi* (figs. 7, 8) selected were drawn to different magnifications, instead of to the same magnification, which would have brought out the difference in size. Also fig. 12 should have been parallel-sided, not oval.

The originals of all the figures in the text were drawn by the author, with the exception of those of the larvae (figs. 14, 16, 17), which were drawn by Miss O. F. Tassart from specimens in alcohol. H. S.]



Miss O. F. Tassart del.

COLEOPTERA. TENEBRIONIDÆ.

No. VI.—COLEOPTERA: CLERIDAE.

Von Sigm. Schenkling (Berlin-Dahlem).

(Mitgeteilt von Prof. J. Stanley Gardiner, M.A., F.R.S., F.L.S.)

(4 Textfiguren.)

Gelesen den 5. Mai, 1921.

Von den Seychellen waren bisher ausser der kosmopolitischen *Necrobia rufipes* De Geer noch keine Cleriden bekannt. Alluaud erwähnt zwar in seinem Reisebericht in Bull. Soc. Ent. France, 1893, p. xcviii, zwei Cleriden, die er auf diesen Inseln gefangen hatte, gibt aber keine Namen an. In der neuesten grösseren Arbeit über die gesamten bisher bekannten Coleopteren der Seychellen von H. Kolbe (Mitteil. Zool. Mus. Berlin, v. 1910) wird auf p. 24 ausser dem Hinweis auf Alluaud nur die oben aufgeführte, über die ganze Erde verbreitete *Necrobia* genannt.

Unter dem mir von Herrn Hugh Scott, Curator am University Museum zu Cambridge (England), zur Determination überlassenen Material, das von ihm als Mitglied der "Percy Sladen Trust Expedition to the Indian Ocean" auf den Seychellen und von den andern Mitgliedern auf einigen benachbarten Inseln gesammelt wurde, sind 7 Arten Cleriden vertreten, von denen 2, *Tarsostenus univittatus* Rossi und *Necrobia rufipes* De Geer, als alte Kosmopoliten bekannt sind. Die 5 übrigen Arten weisen eine enge Verwandtschaft mit der Fauna Madagaskars auf. Die Gattung *Pallenis*, von der hier eine neue Spezies vorliegt, ist mit 52 bekannten Arten auf Madagaskar und den Comoren vertreten, und nur eine (mir unbekannte) Art, *misella* Boh., ist vom Oranjefluss beschrieben; zwei weitere als *Pallenis* beschriebene Arten, *fulvescens* Chevr. und *ruficollis* Kuw. von Ostindien resp. Timor gehören zweifellos nicht hierher. *Stenocylidrus* hat bisher 49 Arten, die mit Ausnahmen von 2 von Usambara beschriebenen Arten* sämtlich auf Madagaskar, den Comoren und der Insel Bourbon vorkommen; jetzt treten 2 neue Spezies von den Seychellen hinzu. Das Genus *Platyclerus* umfasst 7 Arten von Madagaskar und Nossi Bé, die häufigste davon, *P. planatus* Cast., wurde jetzt auch auf der Insel Aldabra gefunden. Für eine auf den Seychelleninseln Silhouette und Mahé gefundene Spezies war die Aufstellung einer neuen Gattung nötig.

Pallenis, Cast.

1. *Pallenis laterisignatus*, n. sp. (Fig. 1).

Niger, opacus, capite dense sat fortiter coriaceo, ore, palpis antennarumque basi rufis, pronoto valde convexo, dorso fortiter longitudinaliter strigato, parte postica laevi, nitida, lateraliter flavo nodoso, elytris antice seriatim punctatis, nitidis, postice dense asperatis et griseo pilosis, basi utrinque tuberculo valido oblongo, nigro penicillato, elytris in medio fascia angusta alba, dense albo sericea, metasterno albo sericeo, femoribus, tibiis tarsisque basi rufis.

* Von diesen ist der *St. rufus* Hintz sicher ein *Gyponyx*.

Long. 5·5—6 mm. 6 Exemplare.

Loc. "Seychelles: Silhouette, Mahé. Silhouette: forest near Mont Pot-à-eau, ca. 1500 feet, viii. 1908; forest near the plateau of Mare aux Cochons and above, over 1000 feet, viii.—ix. 1908. Mahé: high forest of Morne Blanc and Pilot, ca. 1500—2000 feet, xi. 1908."

Oberseits grössenteils matt, nur der eingeschnürte Teil des Halsschildes und die vordere Hälfte der Flügeldecken glänzend. Basis der Schenkel und Schienen sowie die ersten Glieder der Tarsen und Fühler rot, dieselbe Färbung zeigt eine längliche Wulst jederseits an dem eingeschnürten Teile des Halsschildes. Die Reihenpunktierung der Flügeldecken geht genau bis zu der weissen Mittelbinde; der Basalhöcker der Flügeldecken ist sehr kräftig und mit einem dichten Büschel langer schwarzer Haare besetzt, der zuweilen abgerieben ist; der fein rauh skulptierte Teil der Flügeldecken beginnt erst ein Stück *hinter* der Querbinde, er reicht neben der Naht etwas weiter nach vorn als an den Seiten.

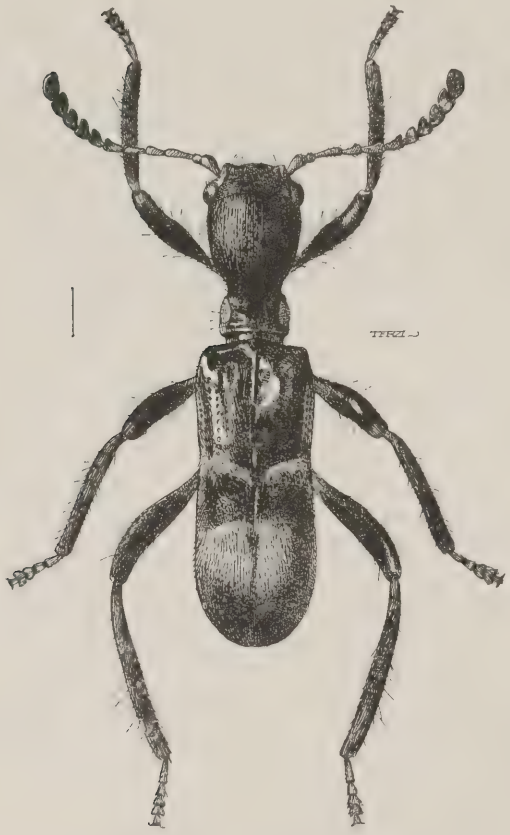


Fig. 1. *Pallenis laterisignatus*, × 10.

Steht der *P. plicata* Fairm. von Madagaskar sehr nahe, besonders unterschieden durch die kleinere Gestalt, die gelbe, wulstförmige Erhabenheit an den Seiten der Halsschildeinschnürung, die gelbe Basis der Schienen und des Tarsus, die *nicht* über die Querbinde hinausgehende erste Punktreihe der Flügeldecken und den länglichen Höcker an der Basis der Elytren.

Die Art trägt die Merkmale der von Kuwert 1893 aufgestellten Gattung *Pseudopallenis*, die ich in Gen. Ins. (Wytsman) 1903 sowie in Col. Cat. Cler. 1910 angenommen hatte. Seitdem bin ich aber zu der Überzeugung gekommen, dass diese Gattung nicht haltbar ist, höchstens könnte sie als Subgenus von *Pallenis* Berechtigung haben.

Stenocylidrus, Spin.

2. *Stenocylidrus dimidiatus*, n. sp. (Fig. 2).

Niger, nitidus, elytris flavo marginatis, interdum antice flavo plagiatis, pone basin tuberculatis, ad medium usque crebre seriatim punctatis, in medio fascia angusta alba, extus dense albo sericea, antennis pedibusque flavis, nigro variegatis.

Long. 3·5—4 mm. 5 Exemplare.

Loc. "Seychelles. Silhouette: forest near the plateau of Mare aux Cochons, over 1000 feet, and high forest above, 1000—2000 feet, viii.—ix. 1908."

Kopf undeutlich fein punktuliert; Fühler bis hinter den Basalhöcker der Flügeldecken reichend, meistens gelb, die beiden ersten Glieder der Keule schwärzlich, oft auch das

Endglied in der Basalhälfte dunkel, bei manchen Exemplaren sind auch die Spitzen der Glieder 5—8 geschwärzt. Halsschild fast glatt, lebhaft glänzend. Flügeldecken hinter der Basis gehöckert, entweder braunschwarz mit gelbem Seiten- und Hinterrand oder auf der Vorderhälfte in der Nähe der Basis gelb, die Höcker sowie die Schultern sind jedoch immer schwärzlich; auf der Mitte befindet sich eine weisse, nach dem Aussenrande zu dicht glänzend weiss tomentierte Querbinde. Die grobe Reihenpunktierung hört am Hinterrande der Querbinde scharf auf; die Spitzenhälfte der Decken ist glänzend, äusserst fein punktuliert und mit längeren gelben Haaren besetzt. Unterseite schwarz, Mittel- und Vorderbrust zum Teil heller. Beine gelb, Schenkel geschwärzt, Schienen und Tarsen schwarz mit gelber Basis.

Die Art hat viel Beziehung zu dem mir nur der Beschreibung nach bekannten *St. lividipes* Fairm., den sein Autor später zur Gattung *Rhopaloclerus* zog. Die Form des Halsschildes ist jedoch die für *Stenocylidrus* typische, auch weicht die neue Art in Skulptur und Färbung stark von der genannten Spezies ab.

Fig. 2. *Stenocylidrus dimidiatus*, × 12.

Fig. 3. *Stenocylidrus glaber*, × 12.

3. *Stenocylidrus glaber*, n. sp. (Fig. 3).

Flavo-brunneus, glaber, nitidissimus, capite prothoraceque nigris, antennis pedibusque flavis, nigro variegatis, elytris totis glabris, basi tuberculatis, in medio albo sericeo fasciatis.

Long. 3·5—4 mm. 6 Exemplare.

Loc. "Seychelles. Mahé: country above Port Glaud, ca. 500—1000 feet, xi. 1908; near Morne Blanc, ca. 1000 feet."

Der vorigen Art in vielen Punkten ähnlich, namentlich auch in der eigentümlichen Färbung der Fühler. Flügeldecken gelbbraun, auch auf Schultern und Höcker, in den hinteren zwei Dritteln mehr oder weniger angedunkelt, ganz ohne Punktreihen, auch die feine Punktulierung kaum wahrnehmbar, etwas vor der Mitte befindet sich eine schmale, aus kurzen weissen Seidenhaaren gebildete Querbinde, die an der Naht unterbrochen ist. Unterseite gelbbraun, Spitze des Hinterleibes schwärzlich. Beine gelbbraun, Schenkel und Schienen in ihrer Mitte breit geschwärzt, auch die Tarsen nach dem Ende zu schwärzlich.

PLATYCLERUS, Spin.

4. *Platyclerus planatus*, Cast.

1 Exemplar.

Loc. Aldabra (J. C. F. Fryer, 1908—9). Madagascar.

ANTHRIBOCLERUS, n. gen.

Elongatus, convexus, longe pilosus. Caput breve, latum, oculi non excavati, subtiliter granulati, palpi labiales et maxillares articulo ultimo late securiformi; antennae 11-articulatae, articulo tertio cylindrico, articulis 4—10 ad apicem dilatatis. Pronotum magnum, lateribus basique fortiter marginatum. Elytra pone basin impressa, bigibbosa. Tarsi 4-articulati, articulis tribus primis vix lamellatis; unguiculi simplices, longe setosi.

5. *Anthriboclerus scotti*, n. sp. (Fig. 4).

Nitidus, niger, antennis (clava nigra), pedibus abdomineque basi testaceis, elytris obscure flavo-brunneis, apicem versus nigrescentibus, ante medium flavo fasciatis, fascia nigro circumcincta, ad suturam interrupta, elytris juxta scutellum tuberculo nigro penicillato instructis.

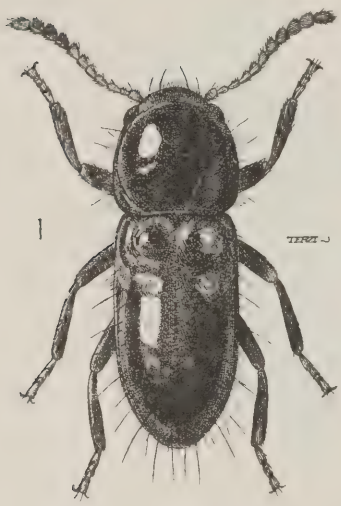


Fig. 4. *Anthriboclerus scotti*, × 18.

Long. 2—2·5 mm. 9 Exemplare.

Loc. "Seychelles: Silhouette, Mahé. Silhouette: forest near the plateau of Mare aux Cochons and above, over 1000 feet, viii.—ix. 1908. Mahé: high forest of Morne Blanc and Pilot, ca. 1500—2000 feet, xi. 1908; near Morne Blanc, ca. 1000 feet, xi. 1908; Cascade Estate, ca. 1000 feet."

Kopf glänzend, dunkelrot, nach hinten fast schwarz, äusserst fein punktuliert und mit langen grauen und schwarzen Haaren einzeln besetzt; Stirn breit, Augen klein, länglich; Fühler allmählich nach dem Ende zu verbreitert, gelb, die letzten 4 Glieder schwarz, oft auch das 2. und 3. Glied teilweise geschwärzt. Halsschild sehr glatt und glänzend, mit deutlich abgesetztem Rande, der namentlich an den Seiten und hier besonders hinten breit aufgebogen ist. Flügeldecken glatt und glänzend, dicht hinter der Basis mit je einem starken Höcker, der mit einem (mitunter abgeriebenen) langen schwarzen Haarpinsel gekrönt ist; hinter dem Höcker mit einer geraden weissgelben Querbinde, die weit vor der Naht aufhört; die Flügeldecken sind schmutzig braungelb, um die Querbinde herum und auch vor der Spitze wie am Seitenrande schwärzlich. Unterseite schwarzbraun, der erste Bauchring und die Beine gelb, die Schienen mitunter gebräunt.

Bei nicht ganz ausgereiften Stücken sind die Flügeldecken und der Halsschild heller gefärbt, namentlich ist der aufgebogene Rand des letzteren deutlich gelb.

Die Art hat viel Ähnlichkeit mit einer kleinen Anthribide, die mit ihr zusammen vorkommt und die Jordan unter dem Namen *Cleranthribus colydiopsis* (eine zweite Art ist *anthicopsis* Jord. von ebendaher) beschrieben hat (Trans. Linn. Soc. London, Zool. XVI. 3, p. 258—259 (1914)).

Die viergliedrigen Tarsen und der deutlich abgesetzte Pronotalrand weisen die Gattung unter die Corynetinae; eine Verwandtschaft mit anderen Gattungen ist zur Zeit nicht nachweisbar.

Tarsostenus, Spin.

6. *Tarsostenus univittatus*, Rossi.

3 Exemplare.

Loc. "Seychelles. Mahé: Cascade Estate, ca. 1000 feet, ii. 1909. Anonyme Island, about 4 miles from the coast of Mahé, i. 1909."

Necrobia, Ol.

7. *Necrobia rufipes*, De Geer.

32 Exemplare.

Loc. Seychellen, Mahé. Coetivy (J. S. Gardiner, 1905). Providence, Cerf I. (J. S. Gardiner, 1905). Amirantes, Eagle I. (J. S. Gardiner, 1905). Aldabra (Thomasset, 1907). Astove (1907). Cosmoledo (1907).

No. VII.—THE HYDROIDS FROM THE CHAGOS, SEYCHELLES AND OTHER ISLANDS AND FROM THE COASTS OF BRITISH EAST AFRICA AND ZANZIBAR.

By Florence E. Jarvis.

(Communicated by Professor J. Stanley Gardiner, M.A., F.R.S., F.L.S.)

(With Plates **24—26** and Text-Figures 1—6.)

Read 5th May, 1921.

The two collections of Hydroids which form the subject of this report were received by Dr H. W. Marett Tims, M.A., M.D., from Professor J. Stanley Gardiner. Dr Tims however was only able to identify a few of the Sertularian forms (those initialled H.W.M.T. in the text below) before volunteering for military service and during his absence I was able to complete the report.

The specimens from British East Africa and Zanzibar were collected by Mr Cyril Crossland. I wish to express my indebtedness to Professor J. Stanley Gardiner for the original loan of the collections, to Dr Tims for handing over the material to me, and to Dr R. Kirkpatrick for his valuable help during the course of the investigations.

The combined collections form a large amount of material, obtained from a wide area, namely, from Pemba Island eastward to Chagos and southward to Mauritius, at depths down to one hundred and fifty fathoms. As found by previous investigators in collections from the more southern parts of this coast of Africa and from Madagascar, the majority of the species belong to the suborder Calyptoblastea. Billard, in material from Madagascar, records one Gymnoblast, *Eudendrium capillare*, in an entire collection of thirty-three species; Warren, in a collection from Natal, finds ten Gymnoblasts out of a total of thirty-five, while in the present collections twelve have been identified out of eighty-six species.

The identification of certain forms has frequently been very perplexing. In the case of some genera, e.g. *Sertularia*, the number of species already described is large, but the characters upon which new species have been established are often so slight and so variable that one cannot avoid the conclusion that many of the so-called species are either local or bathymetric variations. The number of species regarded in this report as new to science is relatively small. In cases where differences have appeared to be slight, specimens have been placed under that well-established species to which they seem most closely related, giving the points in which they differ from the type. Many of these differences may doubtless be attributed to the varying depths at which the specimens were living and to the influence of currents, for it is certain that these factors have a marked effect on the mode of growth of colonies. The value of measurements is probably over-estimated, since they like other minor factors tend to vary. The measurements given in this report are intended to serve as guides to the dimensions of the various forms in the definite localities, and need not necessarily apply to specimens from other localities. Through the kindness of Dr R. Kirkpatrick opportunity has been afforded for the examination of numerous type

specimens in the British Museum collections. This has greatly facilitated the work of specific identification in many instances.

The collections taken as a whole are representative in character, comprising forms from all the large families of the Hydroida, and ranging from minute epizoic species to large flourishing colonies, such as *Aglaophenia cupressina*, which reach a height of 25 cms. No new generic form has been discovered, but a number of new and interesting species, especially of Plumularians, are described.

The following eight species have also been recorded by Billard from Madagascar: *Hebella calcarata, Campanularia corrugata, Thyroscyphus vitiensis, Thuiaria lata, Th. interrupta, Idia pristis, Halicornaria ferlusi* (variety) and *Lytocarpus philippinus.*

Comparing with the records from Natal, it is found that six species are common to the two localities: *Sertularella tumida, Sertularia loculosa, S. linealis, Thuiaria tubuliformis, Antenella secundaria* (*A. natalensis*) and *Thyroscyphus æqualis.*

Twenty-five species occur in the Indo-Malayan region: *Corydendrium sessile, Pennaria disticha, Ectopleura pacifica, Eudendrium attenuatum, Hebella crateroides, H. calcarata, Thyroscyphus vitiensis, Campanularia corrugata, C. serrulatella, Gonothyrea longicyatha, Sertularia tenuis, S. turbinata, Diphasia digitalis, D. mutulata, Idia pristis, Synthecium tubiger, Plumularia spiralis, P. alternata, Antenella secundaria, Aglaophenia cupressina, Thecocarpus brevirostris, Lytocarpus hornelli, L. philippinus, L. singularis* and *L. phœniceus.*

Common to the present collections and the Australian fauna are 23 species: *Pennaria disticha, Eudendrium attenuatum, E. generalis, Perisiphonia exserta, Cryptolaria crassicaulis* var. *dimorpha, Hebella calcarata, Campanularia serrulatella, Sertularia brevicyathus, S. loculosa, S. marginata, S. tenuis, S. turbinata, Sertularella tumida, Diphasia digitalis, D. mutulata, Idia pristis, Thuiaria interrupta, Synthecium subventricosum, S. patulum, Antenella secundaria, Aglaophenia cupressina, Lytocarpus philippinus, L. phœniceus.*

The local distribution of the following additional species has been increased: *Eudendrium cochleatum, E. exiguum, Cryptolaria conferta, Campanularia cheloniæ, Sertularia cornicina, S. heterodonta, Sertularella conica, Synthecium reteum, Plumularia alternata, P. corrugata* and *Thecocarpus mammillatus.*

The species regarded as new include several very interesting forms. Among these are: *Halecium gardineri*, provided with sarcothecæ; *Sertularella thecocarpa*, in which the gonotheca arises from the lumen of the hydrotheca; *Synthecium dentigerum*, in which the wall of the hydrotheca is thickened to give a large inwardly-directed tooth; *Plumularia providentia*, bearing pinnæ on one side of the stem only; *P. multithecata*; *Cladocarpus alatus*, with extremely large lateral sarcothecæ applied to the margin of the hydrotheca; and (?) *C. plumularioides*, with an additional mesial sarcotheca on the internode above the hydrotheca.

The phenomenon of stolonisation has been observed in several instances. The ends of branches, occasionally of stems, may be produced in stolons; this occurs in *Sertularia loculosa, S. turbinata, S. marginata, Lytocarpus philippinus* and *Thecocarpus laxus.* In the first two, the stolons end in adhesive discs, similar to those figured by Thornely in

Sertularia lingulata. In *L. philippinus*, the stolons are simple, straight extensions of the pinnæ. In *S. marginata* a stem bearing hydrothecæ is given off from the stolon at some distance from the point of origin of the latter. The branch may in this case represent the beginning of a new colony, the stolon thus being propagative in function, while in the forms previously mentioned the function is probably that of fixation only. In *Synthecium dentigerum*, a stolon arises from the lumen of a hydrotheca.

The classification adopted is that of Hincks. The term sarcotheca has been used throughout to mean the cup into which the defensive zooids are retractile and the term sarcostyle to mean the soft tissues within the cup. This nomenclature is in accordance with the terms used for the larger cups and nutritive zooids, viz. hydrotheca and hydranth.

Gymnoblastea.

1. *Eudendrium attenuatum* Allman, 1877. (3.)

Amirante, 36 and 39 fms.

2. *Eudendrium cochleatum* Allman, 1877. (3.)

Farquhar Atoll, off shells. Fragmentary colonies without cœnosarc and overgrown by a Campanularian are doubtfully referred to this species.

3. *Eudendrium exiguum* Allman, 1871. (3.)

Providence, 29, 50—78 and 50 fms. The colonies reach a height of 2 cms., are delicate, and have few branches. The basal portion of the stem is polysiphonic. Branches and secondary ramuli are provided with three or four annulations at their origin.

4. *Eudendrium generalis* von Lendenfeld, 1884. (48.)

Amirante, 36 fms.; Zanzibar.

5. *Bougainvillea ramosa* van Beneden, 1867.

Zanzibar.

6. *Bougainvillea* sp.

Amirante, 39 fms. This may be an attenuated form of *B. ramosa*, with which it agrees in character of branching, cessation of perisarc at the base of the hydranth, and the slight annulation at the base of the branches.

7. *Perigonimus* sp.?

Wasin, 10 fms. The specimens cannot be identified with certainty owing to the poor state of preservation of the hydranth. The hydrorhiza is creeping, the hydrocauli erect, simple, and faintly annulated at their origin.

8. *Corymorpha nutans* Sars, 1835.

Cargados, 30 fms.

9. *Podocoryne carnea* Sars.

Wasin.

10. *Pennaria disticha* Goldfuss var. *australis* Bale, 1884. (9.)

Zanzibar and Pemba. The annulation at the origin of primary and secondary branches, which is characteristic of this variety, is clearly marked. The main stem possesses two or three rings at the origin of the primary branches, while the latter have usually four rings

at their base and two or three immediately succeeding the peduncles of the hydranths. The peduncles themselves have four or five annulations at the base.

11. *Corydendrium sessile*, Ritchie, 1910. (59.)

Cargados, 30 fms.; Amirante, 28 fms. The thick and stunted growth of the colonies agrees with Ritchie's description. The stem is strongly polysiphonic and irregularly branched, the branches giving off secondary ramuli in the same plane. Hydranth tubes occur on the anterior face of branches and ramuli; they are wide, completely adnate on the posterior wall and provided with a smooth circular aperture directed upwards and slightly forwards. The hydranth is large and pyriform with scattered tentacles, which in a contracted state appear wide at the base and taper to a sharp point. The perisarc contains numerous sponge spicules. Gonosome absent.

12. *Ectopleura pacifica* Thornely, 1904. (64.)

Zanzibar. The species is represented by several large colonies growing on an alga. They agree in the main with the description given by Thornely, except that the basal processes mentioned by that author are absent. The inner whorl of tentacles is filiform. Mature gonophores showing the characteristic pair of tentacles are present.

Calyptoblastea.

13. *Halecium gardineri* n. sp. (Plate **24**, fig. 1.)

Salomon, Chagos, 60—120 fms. This interesting species is represented by a single large colony. The hydrorhiza forms a close network of ramifying tubes on an alga, and the wall is strengthened by internal peg-like thickenings of the perisarc. From the hydrorhiza are given off (1) erect stems not more than 0·8 cm. high and usually unbranched, (2) hydrothecæ, (3) sarcothecæ and (4) a male gonosome.

The hydrocaulus is regularly divided by annular constrictions, either transverse or slightly oblique. Processes near the upper ends of the internodes bear the hydrothecæ, the peduncles of the latter being separated from the processes by twisted joints. The peduncles are of very varying length; in the proximal part of the colony they are long and rugose, while distally they are short and smooth and widen gradually into the hydrothecæ. The margin of the hydrotheca is even, not everted, without the bright points so common in the Haleciidæ. Occasionally two hydrothecæ spring from the stem-process. Sarcothecæ occur most frequently on the hydrocaulus just above the stem-process, but are also present in other positions. They resemble the hydrothecæ in shape, but are much smaller. Those carried by the hydrorhiza are similar in form. The hydranth in a retracted state extends some distance beyond the margin of the hydrotheca and is provided with about eighteen tentacles. The sarcostyle is club-shaped, without tentacles. The single male gonosome is carried on a short thick stalk, is cylindrical in shape, its distal end circular and concave.

14. *Halecium halecinum* Linnæus, 1758.

Pemba and Zanzibar.

15. *Halecium minutum* Broch, 1903.

On *Bougainvillea* sp. from Amirante, 39 fms.; on *Eudendrium* sp., locality unknown.

16. *Zygophlax biarmata* Billard, 1906. (22.)

Amirante, 30—100 fms.; Providence, 50—78 fms.; Salomon, Chagos, 60—120 fms.; Seychelles, 20 and 37 fms. The colonies reach a height of 5 or 6 cms. The main stem is erect, rigid, polysiphonic almost to the tip. The pinnæ are irregularly alternate, in the same plane, and diverging at almost a right angle. The hydrothecæ are alternate, cylindrical, with a markedly convex dorsal wall, and spring from well-defined apophyses which bear two laterally placed sarcothecæ. In a few cases only one sarcotheca is present. The margins of the hydrothecæ and sarcothecæ show several reduplications. Gonosomes absent.

17. *Zygophlax recta* n. sp. (Plate **24**, fig. 2.)

Mauritius, 1—100 fms.; Saya de Malha, 145 fms. The species resembles *Z. biarmata* in habit, but is more delicate. The hydrothecæ are relatively much longer in comparison with their diameters than in *Z. biarmata*. Proximally they are very narrow, and gradually increase in breadth towards the apertures. The dorsal wall is much straighter than in allied forms, and the margin is slightly everted. The sarcothecæ resemble those of *Z. biarmata*.

	Z. biarmata Billard	*Z. recta* n. sp.
Measurements: length of hydrotheca	300—315 μ	0·45—0·63 mm.
breadth of hydrotheca at base	—	0·07—0·08 mm.
breadth of hydrotheca at mouth...	50—85 μ	0·15 mm.
length of sarcotheca	70—120 μ	0·07—0·10 mm.
breadth of sarcotheca at mouth	35 μ	0·03 mm.

18. *Lafœa fruticosa* Sars, 1862.

Saya de Malha, 145 fms.

19. *Perisiphonia exserta* (Johnson), 1858.

Locality unknown. A very small broken fragment is referred doubtfully to this species.

20. *Cryptolaria conferta* Allman, 1877. (3.)

Providence, 50—78 fms. The species is represented by two fragmentary colonies, one of which consists of an unbranched stem bearing hydrothecæ of the typical cylindrical form, the other bearing a branch, the end of which is produced into an adhesive stolon.

21. *Cryptolaria crassicaulis* Allman var. *dimorpha* Ritchie, 1911. (61.)

Salomon, Chagos, 60—120 fms. In addition to the form of hydrotheca characteristic of *C. crassicaulis*, the specimen shows one hydrotheca which differs from the rest in that it arises separately from the stolon, is erect and completely free, and closely resembles in shape the hydrotheca of *Hebella*. The free hydrotheca is also considerably smaller than the typical form, as will be seen from the following measurements: length of free hydrotheca 1·02 mm.; breadth of same at mouth 0·22 mm.; length of adnate portion of typical hydrotheca 0·85—0·88 mm.; length of free portion of same 0·44—0·48 mm.; breadth of same at mouth 0·24—0·32 mm.

22. *Cryptolaria rectangularis* n. sp. (Plate **24**, fig. 3.)

Providence, 125 fms. The material consists of a part of a colony 0·7 cm. high and lacking both basal and distal portions. Fascicling tubes are few and limited to the proximal

end of the stem. Branches are irregular, or perhaps opposite, and polysiphonic for a short distance beyond their origin. The hydrothecæ are alternate, long and tubular, the proximal halves erect and adnate, the distal diverging at a right angle. The margin is smooth with several reduplications and circular aperture. A well-marked fold occurs in the lower wall of the hydrotheca at the point of divergence. Gonosomes absent.

This species differs from *C. angulata* Bale in the straightness of the upper wall of the hydrotheca in its divergent portion and in the absence of an internal thickening opposite the fold. Bale notes that in some instances the bend in the upper wall of *C. angulata* is wanting, but he regards the internal thickening as one of the diagnostic characters of his species. If it should be found that this thickening ever occurs in *C. rectangularis* or is occasionally absent from *C. angulata*, then the two species would probably be correctly regarded as varieties of the same form. *Measurements:* length of adnate portion of hydrotheca 0·35—0·4 mm.; length of free portion of same 0·41—0·54 mm.; breadth at mouth 0·15—0·19 mm.

23. *Hebella crateroides* Ritchie, 1909.

Farquhar Atoll, on *Eudendrium cochleatum*, off dead shells. A single hydrotheca and gonosome are present. The former is somewhat damaged but the latter corresponds in every way with Ritchie's description.

24. *Hebella cylindrica* (von Lendenfeld), 1884. (48.)

Locality unknown. The margin of the hydrotheca is well everted, more than in Bale's Australian form, and frequently with two or three reduplications.

25. *Hebella calcarata* (Agassiz), 1862.

Providence, 50—78 fms., on *Synthecium tubithecum*; Pemba, on *Thyroscyphus vitiensis.*

26. *Gonotha longicyatha* Thornely, 1904. (64.)

Cargados, 30 fms.; Saya de Malha, 150 fms.; Zanzibar, floating in the plankton. The colonies reach a maximum height of 1·5 cms. The branching is irregular and in a few instances the main stem is strengthened by downgrowths from the bases of the peduncles of the hydrothecæ. The peduncles are generally annulated throughout. The margin of the hydrotheca is produced into long needle-like points which are separated by alternating deep and shallow bays. In one specimen from Cargados the hydranths, although well extended, do not reach to the margin of the hydrotheca; they are provided with about eighteen tentacles. Numerous truncate gonothecæ of the typical form are present. The colony from the plankton shows a much more attenuated growth than the rest of the specimens and in it the bays of the margins of the hydrothecæ are less deep.

27. *Campanularia cheloniæ* Allman, 1888. (5.) (Plate **24**, fig. 4.)

Zanzibar. A large flourishing colony was obtained, growing on a shell of *Lepas* and reaching a height of 1·5 cms. The main stems arise at close intervals from the creeping hydrorhiza, giving off branches which are irregularly alternate and especially abundant near the distal end. The branches themselves give rise to secondary ramuli. The main stem shows five or six annulations at the origin of the branches and the latter the same at the origin of the ramuli. The ramuli are annulated throughout their entire length or at

the proximal ends only. The hydrotheca is cup-shaped with an entire margin, while the hydranth possesses about twenty tentacles. Long cylindrical gonothecæ are borne on short ringed peduncles arising in the axils of the peduncles of the hydrothecæ; at their distal ends are slightly marked collars and their mouths are concave.

The specimens under consideration differ from the type in their much greater height and in the presence of gonosomes. The latter are not figured in the "Challenger" forms which may have been immature. *Measurements:* length of hydrotheca 0·16—0·18 mm.; breadth of hydrotheca at mouth 0·18—0·2 mm.; breadth of same at base 0·07—0·08 mm.; length of gonotheca 0·40—0·45 mm.; maximum breadth of same 0·22 mm.

28. *Campanularia corrugata* Thornely, 1904. (64.) (Plate **24**, fig. 5.)

Zanzibar, 6 fms., on stem of a Plumularian; Wasin, 10 fms.; Cargados, 45 fms., on *Lytocarpus phœniceus* (Busk). The creeping hydrorhiza gives rise to erect, simple hydrocauli, which are annulated throughout their length. The perisarc is considerably thickened below the base of the hydrotheca. The latter is about twice as long as wide, with a simple, sinuous margin. The hydranth has about twenty tentacles. Gonosome absent. *Measurements:* length of hydrotheca 0·66 mm.; breadth of hydrotheca at mouth 0·44 mm.

29. *Campanularia ptychocyathus* Allman, 1888. (5.)

Amirante, 36 and 39 fms., the latter on a Polyzoan; Wasin, 10 fms., on an alga.

30. *Campanularia serrulatella* (Thornely), 1904. (64.)

Amirante, 29, 32 and 18 fms.; Cargados, 30 fms. The colonies show no definite main stem, only a basal portion giving rise to a number of branches which bear both secondary ramuli and hydranths. The proximal parts of the branches are in several cases strengthened by downgrowths from the peduncles of the hydrothecæ. The peduncles are of varying length, either annulated in the proximal and distal parts or throughout their length. The hydranth is slightly raised up above the diaphragm at the base of the hydrotheca, but this character is much less marked than in the description of the type specimen. Gonosomes of the typical form occur.

31. *Thyroscyphus æqualis* Warren, 1908. (70.)

Cargados, 45 fms.; Prison Island, Zanzibar, 8 fms. and shallower; Wasin, 10 fms. The diaphragm at the base of the hydrotheca is in the form of a continuous ridge and in this respect resembles that found in the Natal specimens. Ritchie regards this species as identical with *T. regularis*, specimens of which he described from the Mergui Archipelago (59). In these the diaphragm is in the form of a row of small chitinous prominences, not in a continuous ridge. The latter character appears to be constant in forms from the western side of the Indian Ocean and thus seems to be one of specific value.

	T. æqualis	*T. regularis* (Ritchie)
Measurements: maximum height of colony ...	20 cms.	—
distance between hydrothecæ	1·1—1·25 mm.	1·13—1·3 mm.
diameter of peduncle	0·14—0·15 mm.	·20 mm.
length of hydrotheca	0·85—0·9 mm.	·96 mm.
breadth of hydrotheca at mouth...	0·75 mm.	·63 mm.

32. *Thyroscyphus vitiensis* Marktanner-Turneretscher, 1890. (49.)

Amirante, 25—80 fms.; Pemba; Zanzibar, 0—2 fms. Examination of the type specimens of *Campanularia juncoides* Borradaile has shown that the latter is identical with this species.

33. *Sertularia brevicyathus* (Versluys), 1899. (69.) (Plate **24**, fig. 6.)

Amirante, 29 fms.; Cargados, 30 fms.; Saya de Malha, 150 fms.; Wasin, 10 fms.; Zanzibar, surface. The hydrocaulus is typically simple, corresponding to Nutting's description of the American form. The material includes, however, a pinnate variety from Saya de Malha. In this the basal part is wanting, but the hydrothecæ above are all strictly paired and contiguous in front. The pinnæ are given off at right angles and arise from processes of the stems immediately below hydrothecæ. The process is cut off distally by a slightly oblique node and is followed by an athecate internode of varying length. The latter is cut off distally by a splice-like joint and is followed by thecate internodes.

In the determination of this species the synonymy discussed by Bale has not been adopted. *S. brevicyathus* is considered distinct from *S. marginata* for the following reasons: (1) in *S. brevicyathus* the internodes are constantly of a much greater length; (2) in *S. brevicyathus* the hydrothecæ are much more robust; (3) the hydrothecal aperture in *S. brevicyathus* is directed almost straight outwards, whereas in *S. marginata* it is directed forwards and outwards—the arrangement of the pairs of hydrothecæ in relation to the colony as a whole is thus entirely different in the two cases; (4) in the method of branching the two species are very different. While in *S. brevicyathus* the pinnæ arise below one of a pair of hydrothecæ, in *S. marginata* they are given off below axillary hydrothecæ. Further, in *S. brevicyathus* the pinnæ are irregularly scattered and in *S. marginata* they are regularly alternating.

34. *Sertularia cornicina* (= *Dynamena cornicina* McCready, Gymnophthalmata of Charleston Harbour, 1858, p. 204). (H.W.M.T.)

Saya de Malha, 25 fms.; Wasin, 10 fms.; Zanzibar. Except for slight details, the specimens agree with Nutting's (52) description of the American forms. The Saya de Malha colonies are the most luxuriant. The internodes here are shorter than in Nutting's figure and the free portion of the hydrotheca reaches about one-third of the total length. The outer wall of the hydrotheca is thickened just below the margin, where it forms a very slight internal tooth. The basal teeth are clearly marked. The colonies from Wasin are less robust than the preceding and show longer internodes. Gonosomes arise from the hydrorhiza close to a hydrocaulus; the mouths are wider than in Nutting's figure. A short thick form, overgrown with *Hebella*, comes from Zanzibar. Nutting in his later work with some expression of uncertainty and "in the absence of good morphological characters" links this species with *S. complexa* Clarke, though he came to an opposite conclusion in an earlier paper; it seems that his former opinion is the more correct. The chitinous processes extending down from the base of the hydrotheca appear to furnish good and reliable morphological characters; it is therefore best to keep the two species distinct until specimens of one or other are found showing some hydrothecæ with and some without these processes.

35. *Sertularia cornicina* var. *pinnata* var. n.

Saya de Malha, 29 fms. Several specimens of a pinnate variety were obtained. The hydrocaulus is erect, divided transversely at fairly regular intervals. Each node bears a pinna from a process near its proximal end, and, in addition, three hydrothecæ, one axillary, two varying from opposite to alternate. The cauline hydrothecæ are generally adpressed to the stem, especially near the base of the latter, and in some cases the free divergent portion is so reduced as to be practically wanting. The stem diameter decreases suddenly near the distal end where the pinnæ cease, and here the hydrothecæ become contiguous and paired instead of widely separated and lateral. The first internode of the pinna is long, without hydrothecæ, and is cut off distally by a very oblique joint. The pinnæ are very apt to break off at this joint, leaving the stem with a number of spike-like lateral processes. The hydrothecæ and gonosomes are essentially the same as in the non-pinnate form.

36. *Sertularia heterodonta* Ritchie, 1909. (57.)

Cargados, 24 fms.; Zanzibar. The colony from Cargados measures 6·3 mm. in height and is without gonosomes. The small portion of hydrorhiza present shows internal thickenings of floor and roof. The hydrocaulus is erect, unbranched, the basal portion lacking nodes and hydrothecæ; the hydrothecate region is separated from the basal by a splice-like joint. The first internode is short, the remainder long and slender and separated by transverse nodes. Occasionally an oblique node occurs close above a transverse one, so that short athecate internodes are formed. The hydrothecæ are paired, contiguous in front for about one-third their length, separated behind; the distal part diverges at a wide angle. The basal wall of the hydrotheca shows a small triangular tooth situated near the middle line, passing downwards into the cavity of the hydrocaulus, and a second larger tooth, also triangular, nearer the lateral wall and directed upwards into the cavity of the hydrotheca. A third peg-like thickening projects into the hydrotheca from the lateral wall a short distance above the base. The margin possesses three teeth, a large pair of laterals and a smaller superior median. The operculum is in three flaps. Below the margin the hydrothecal walls are produced into three internal thickenings, triangular in shape, and situated on the superior, inferior and abcauline walls. The margin shows several reduplications and in a few cases one or more of the internal processes are repeated. Gonosomes occurring in the Zanzibar colonies are borne singly, one on each hydrocaulus, immediately below the proximal pair of hydrothecæ. They arise from a short stalk, are truncate, with a wide aperture and a single-pieced operculum. The collar is short with a ring of chitinous knobs.

Measurements: length of athecate portion of stem 1·1 mm.; length of internodes 0·48—0·58 mm.; diameter of same near base 0·5—0·6 mm.; length of adnate portion of hydrotheca 0·10—0·12 mm.; length of free portion of same 0·15—0·18 mm.; diameter of hydrotheca at base 0·07—0·10 mm.; diameter of hydrotheca at mouth 0·05—0·06 mm.; length of gonosome 0·76 mm.; breadth of same at mouth 0·27 mm.

37. *Sertularia linealis* Warren, 1908. (70.)

Cargados, 24 fms.; Wasin. The specimens show the typical arrangement of the hydrorhiza in parallel rows on the frond of an alga, the rows being connected by transverse

anastomoses placed at right angles. The hydrocaulus is unbranched, regularly divided by constricted transverse nodes. The hydrothecæ, except in the case of the proximal pair, are contiguous in front for about one-third of their length, then diverging at a right angle. The margin is in two lateral waves and the aperture is directed outwards and slightly upwards. Beneath the margin the perisarc is thickened to give three internal teeth, superior, inferior and posterior in position. The base of the hydrotheca is thickened on the inner side.

38. *Sertularia loculosa* Bale, 1884. (9.) (H.W.M.T.)

Amirante, 22—85 fms.; Saya de Malha, 25 fms. The stems are in all cases unbranched. The specimens in the main resemble Bale's figures, the chief differences lying in (1) the more sharply pointed teeth of the hydrotheca, (2) the greater length of the internodes and (3) the absence of oblique nodes. In many cases the stem is produced beyond the hydrothecate region into a stolon, which terminates in a flattened, lobulated, adhesive disc.

39. *Sertularia marginata* (Kirchenpauer), 1864. (Plate **24**, fig. 7.)

Wasin, 10 fms. Several flourishing colonies reach a maximum height of 3·5 cms. The hydrocaulus is in every case pinnate and the ends of both stems and branches are frequently produced into stolons. In one case a small branch is given off from a stolon at a considerable distance from the origin of the latter. The stolon itself is unattached to any object, but may have been in the living state. The single gonosome arises immediately above the axial hydrotheca of a pinna, is sessile, truncate, with six strongly marked annulations, and produced distally into two lateral horns. This species, as has been pointed out above, is regarded as distinct from *S. brevicyathus* Versluys.

40. *Sertularia tenuis* Bale, 1884. (9.) (H.W.M.T.)

Saya de Malha, 25 fms.; Seychelles, 34 fms.; Cargados, 30 fms. The colonies are all of the non-pinnate variety, ranging from 0·8 to 1·3 cms. in height. Bale figures both simple and pinnate forms, which differ in the length of the internodes and in the angles of divergence of the hydrothecæ. Some specimens from Seychelles agree with the simple variety, but others are intermediate between the simple and pinnate types of Bale, the hydrothecæ being of the pinnate type while the lengths of the internodes approximate to those of the simple form. In the distal parts of the colony the hydrothecæ are generally less divergent than in the proximal.

Comparison of the forms leads to the conclusion that specimens obtained from the lower depths tend to grow stronger and to a greater height than those in more shallow water. Unfortunately Bale does not mention the depth from which his material was obtained. He draws attention to the fact that very slight differences exist between this species and *S. divergens* Lamouroux. From a comparison of the two figures given by him, there would appear to be less difference between the pinnæ of the two species than between the pinnate and simple shoots of *S. tenuis*. Again, the mere fact that "*S. divergens* has usually five or six pinnæ on each side of the stem," while, in *S. tenuis*, Bale only found from one to three pinnæ and sometimes entirely non-pinnate forms, does not appear to be a valid specific distinction, more particularly when note is taken of the fact that the gonosomes are identical. From these considerations there seems justification for the conclusion that the

differences between the two species are probably either local or bathymetric. It is suggested tentatively that the species be united with the retention of the specific name *divergens*, not merely on account of priority, but because the hydrothecæ of *S. tennis*, more particularly of the simple variety, are more divergent than in *S. divergens* itself.

41. *Sertularia turbinata* Lamouroux, 1816. (H.W.M.T.) (Plate **24**, fig. 8.)

Amirante, 22—85 fms.; Centurion Bank, 10—12 fms.; Zanzibar.

The hydrocaulus is in every case simple and divided by transverse nodes. It is frequently produced into stolons which bear adhesive organs exactly similar to those of *S. loculosa*. The hydrothecæ are longer than in *S. loculosa* and divergent at wider angles. The character of the margin is doubtful since the perisarc is thin and the walls usually collapsed. The aperture is directed outwards and somewhat downwards as against outwards and upwards in *S. loculosa*.

42. *Sertularella conica* Allman, 1877, var. (Plate **24**, fig. 9.)

Zanzibar. A variety of this species is represented by a small colony, 1·2 cms. high. The hydrocaulus is erect, monosiphonic, unbranched except in one instance and showing faint indication of division by oblique nodes. The simple branch arises immediately below a hydrotheca. The hydrothecæ are adnate for about half their length, broad below, and taper somewhat in the distal diverging portion. They differ from the typical form in that the annulations are usually carried completely round the distal part of the hydrotheca instead of being limited to the upper side. The margin is in four deep bays, and the aperture directed outwards and upwards as well as slightly forwards. A single gonosome is present, arising from a short peduncle borne laterally near the base of the hydrocaulus opposite the hydrotheca. The body is ovate, annulated throughout its length, and provided with a short collar. The annulations are more deeply marked in the distal than in the proximal half.

Measurements: length of adnate portion of hydrotheca 0·365 mm.; length of free portion of same 0·35—0·4 mm.; diameter at mouth 0·13—0·17 mm.; length of gonosome 1·56 mm.; maximum diameter 0·8 mm.; diameter of collar 0·23 mm.

43. *Sertularella thecocarpa* n. sp. (Plate **24**, fig. 10.)

Centurion Bank, Chagos, 10—12 fms.

Several small colonies were obtained, growing on the fronds of an alga. From the creeping hydrorhiza are given off at close intervals erect stems, usually simple, rarely branched, reaching a maximum height of 0·6 cm. Oblique and twisted nodes occur at regular intervals in the proximal part of the stem, while distally they are less clearly marked. The single branch appears to arise from the lumen of an incompletely developed hydrotheca. The hydrothecæ are alternate, adnate for less than half their length; the walls are smooth and the aperture directed outwards and upwards. The margin has two large, sharply pointed lateral teeth, while the intervening parts are sinuous. In the taller stems the upper part of the hydrocaulus tends to be rugose, while the distance between the hydrothecæ is increased; the uppermost hydrotheca especially is frequently at a long distance from the one below. The fertile stems are more stunted than those without gonosomes. The latter are peculiar in that they arise from the lumen of the hydrothecæ.

One or two are borne on a stem near the base; they are about four times as long as the hydrothecæ, globose, deeply corrugated, the collars short and the apertures small. The presence of a gonosome, arising from the lumen of a hydrotheca, is accordingly not limited to the genus *Synthecium*, and therefore cannot be regarded as peculiar to that genus. The definition of *Synthecium* must therefore rest primarily on the growth habit and the hydrothecal characters and secondarily on the gonosome.

Measurements: length of internodes 0·27—0·34 mm.; length of adnate portion of hydrothecæ 0·17—0·20 mm.; length of free portion of same 0·23—0·26 mm.; breadth of hydrothecæ at mouth 0·12—0·14 mm.; length of gonosome 0·95 mm.; maximum breadth of gonosome 0·80 mm.

44. *Sertularella tumida* Warren, 1908. (70.)

Amirante, 29 fms.; Providence, 39 fms. The species is represented by fragmentary colonies only, varying in height from 0·5 to 1 cm. The stem is unbranched, sinuous, divided by faintly marked twisted nodes. The large hydrothecæ are adnate for half their lengths, while the distal portions diverge at a wide angle. The adnate portion is broad; the distal tapers towards the aperture. The margin is provided with four teeth, two lateral, one inferior and one superior. Below the margin are three prominent triangular teeth, projecting into the cavity of the hydrotheca; two are situated below the upper bays of the margin, the third below the abcauline tooth. *S. tasmanica* described and figured by Bale (15) may probably be regarded as a local variety of *S. tumida*, differing only in the straighter stem and abcauline wall of the hydrotheca.

45. *Thuiaria interrupta* Allman.

Zanzibar. The species is characterised by the arrangement of the hydrothecæ in groups of from four to twelve on the pinnæ and from three to five on the stem. A hydrotheca is carried in the axil of each stem-process bearing a pinna. As in Allman's type the hydrothecæ are provided with two lateral teeth. The longitudinal markings (sulci) of the stem mentioned by that author are absent.

46. *Thuiaria lata* Bale, 1881. (8.) (H.W.M.T.)

Amirante, 39 fms.; Cargados, 45 fms.; Saya de Malha, 47 fms.; Wasin, 10 fms.; Zanzibar. The hydrothecæ show some variation in arrangement and in the characters of the margins. In the specimen from Wasin, the hydrothecæ are very closely set and the marginal teeth not well marked. In the remaining colonies, and especially in those from Cargados, they are much farther apart and the teeth are very clearly seen. Numerous gonosomes occur in the Zanzibar colonies. In them no distinction can be drawn between undulating dorsal and smooth ventral edges, as in Bale's specimens. Longitudinal ridges occur in the distal portion, but these may be due to imperfect fixation. The apex is concave and oblique, being lower on the adaxial than the abaxial side.

47. *Thuiaria tubuliformis* (Marktanner-Turneretscher), 1890. (49.) (H.W.M.T.) (Plate **25**, fig. 13.)

Coetivy, Seychelles; Peros, Diego Garcia, and Egmont, Chagos; Farquhar Atoll; Zanzibar; Pemba. All from the shallow surface reefs.

The typical character of the stem internodes, each carrying a branch and two hydro-

thecæ on one side and a single hydrotheca on the other, is only met with in some of the specimens. Very frequently the distal internodes and occasionally the proximal also bear a branch and three hydrothecæ on one side and two hydrothecæ on the other. In the colonies from Diego Garcia the general arrangement is three hydrothecæ on one side and four on the other. The hydrothecæ of the pinnæ show a marked tendency to become arranged in groups of from four to six. The cœnosarc in several cases contains a quantity of dark pigment. Where the hydranth is expanded it is seen to possess a flattened hypostome and about 24 tentacles. Gonosomes, present in the Egmont reef colonies, are of the typical form.

48. *Diphasia digitalis* (Busk), 1852. (36.) (H.W.M.T.)

Zanzibar and Wasin. In the proximal part of the colony the cauline hydrothecæ are widely separated in front, while the distal parts and on the branches they are contiguous. The proximal internodes are sharply defined and carry either a pair of hydrothecæ or a pair of hydrothecæ and a branch, while in the distal parts of the colony the nodes are less regular. There are uniformly two pairs of hydrothecæ between the alternating pinnæ. Gonosomes, which are numerous in one colony from Zanzibar, are borne on a short but definite peduncle arising from the back of the stem. They are ovoid and very large (not small as in Nutting's description of the American form), tapering at the distal end and beset with numerous spines. The orifice is flat and circular.

49. *Diphasia mutulata* (Busk), 1852. (36.)

Cargados, 45 fms.

50. *Diphasia varians*, n. sp. (Plate **25**, fig. 14.)

Amirante, 22—85, 29 and 25—80 fms.; Saya de Malha, 29 fms.; Zanzibar; Cargados, 45 fms. The colonies are all fragmentary and unbranched, reaching a height of 1·1 cms. The basal portion is without hydrorhiza and separated from the hydrothecate region by an oblique node. The remainder of the hydrocaulus is divided by transverse nodes placed at irregular intervals. One or more pairs of hydrothecæ are borne on each internode. The hydrothecæ are long, tubular, contiguous in front in the distal part of the stem only, and separated behind; generally less than one-quarter is divergent. Where more than one pair of hydrothecæ are borne on one internode, the pairs are closely apposed, the upper pair arising immediately above the point of divergence of the preceding pair. The margin is in two bays formed by two lateral teeth. The perisarc is thick except on the abcauline side of the hydrothecal margin, where it forms a thin collar connecting the two lateral teeth. The specimen from Amirante, 25—80 fms., is a stout form in which as many as ten pairs of hydrothecæ are carried by the first internode, while the remaining internodes carry a single pair. Very frequently, a second operculum occurs below the first, arising at the point of divergence of the distal part of the hydrotheca. A third operculum is occasionally present below the second. Marginal reduplications to the number of five may occur. The hydrothecæ of the colonies from Amirante, 29 fms., have longer divergent portions than the preceding. A distinct variety comes from Cargados; in this a small flap of perisarc projects in from the abcauline wall of the hydrotheca just opposite the point of divergence, and the presence of two opercula is constant.

51. *Pasythea heterodonta* n. sp. (Plate **24**, figs. 11, 12.)

Cargados, 24 fms., and three dredgings 30—45 fms. The colonies reach a height of 0·7 cm. The hydrocaulus is erect, unbranched, arising from a creeping hydrorhiza, and divided at irregular intervals, oblique nodes. The internodes bear one or more pairs of hydrothecæ, which resemble those of *P. quadridentata*. The proximal portion of each is contiguous in front, separated behind, the distal divergent at a wide angle and tapering towards the aperture; the margin has two lateral teeth and the operculum is in two flaps. Below the margin are two prominent triangular teeth projecting into the cavity of the hydrotheca. Gonosomes are borne singly immediately below the proximal pair of hydrothecæ of a stem; in shape they are ovate, with about five annular corrugations. A collar is wanting; the aperture is broad, circular, with a single-pieced operculum. Great variation is shown in the grouping of the pairs of hydrothecæ. In most cases the first one or two internodes bear only a single pair, the remainder having two pairs. At the distal end of the hydrocaulus a few stems have three pairs to an internode, the third pair arising between the second, causing the latter to divide more than normally, while the third pair is itself more erect than the others. The colonies from Cargados are remarkable, since in some cases as many as ten proximal internodes bear each only a single pair of hydrothecæ, the single pairs being followed by two or more groups of two pairs. In many instances three pairs are grouped together, while in a few cases a double pair is interposed between the single pairs. Generally speaking, the grouping is limited to the distal parts of the hydrocaulus. Proximally, where the grouping does not occur, the specimens would in many cases be taken for a species of *Sertularia*.

52. *Pasythea philippina* Marktanner-Turneretscher, 1890. (49.)

Pemba and Wasin.

53. *Idia pristis* Lamouroux, 1816. (H.W.M.T.)

Zanzibar. The pseudo-branching is similar to that described by Allman. The axial hydrothecæ are small, with the aperture directed upwards and backwards, while in the remaining hydrothecæ the apertures are directed backwards. No internal chambers such as Allman describes can be found at the base of the hydrothecæ. Gonosomes occur only on the proximal portion of the main stem below the pinnate portion. They agree rather with Bale's description, since the longitudinal ribs are few; they are not connected by transverse ridges as in the Australian specimens, but agree with the latter in being carried up past the shoulder. The rim of the collar is raised up all round so that the orifice appears to be sunken. Delicate markings pass down from the rim on to the collar.

54. *Synthecium dentigerum* n. sp. (Plate **25**, fig. 15.)

Centurion Bank, Chagos, 10—12 fms. A fragment, consisting of an unbranched stem 1 cm. high, regularly divided by transverse nodes. The internodes bear a pair of cylindrical hydrothecæ, adnate for more than half their length, the distal parts each diverging at a small angle. The inner basal corners of the walls are thickened to give small downwardly directed pointed teeth. A large triangular tooth extends into the cavity of the hydrotheca from the adcauline wall a short distance below the aperture. The margin is even, with several reduplications. A branched stolon issues from the mouth of one hydrotheca.

Allman figures a similar branch arising from a hydrotheca in *S. campylocarpum*; he regards it as abnormal but of interest in repeating in *Synthecium* a feature which constitutes the essential character of *Thecocladium*.

55. *Synthecium patulum* (Busk), 1852. (36.) (H.W.M.T.)

Centurion Bank, Chagos, 10—12 fms.; Amirante, 30—100 fms.; Wasin. In the Centurion Bank specimens the internodes are short and in consequence the hydrothecæ are closely approximated; the margins are deeply sinuate at the sides. Much longer internodes occur in the forms from the second locality; the margins are straighter and with reduplications. The colonies are overgrown with *Hebella*.

56. *Synthecium rectum* Nutting, 1904. (52.)

Seychelles, 37 fms.; Cargados, 45 fms.

57. *Synthecium subventricosum* Bale, 1914. (15.)

Amirante, 25—80 fms., and Zanzibar.

58. *Synthecium tubiger* Borradaile, 1905. (32.)

Amirante, 22—85, 34 and 20—44 fms.; Providence, 50—78 fms.; Cargados, 30 and 45 fms.; Saya de Malha, 29 fms.

59. *Synthecium tubithecum* (Allman), 1877. (3.)

Amirante, 20—44 fms.; Providence, 50—78 fms.; Cargados, 30 fms.; Wasin, 10 fms.

60. *Plumularia alternata* (Nutting), 1900. (51.) (Plate **25**, fig. 16.)

Amirante, 20—44 fms.; Seychelles, 44 fms.; Wasin, 10 fms.; Zanzibar. The hydrosome is similar in all essential characters to the American form. Considerable variation exists in the amount of flexure and length of the internodes of the different colonies. In the specimen from Amirante the two proximal pinnæ of the stem are paired, being carried on processes which arise from each side of the stem instead of from one side only. This proximal part of the stem is cut off from the remainder by an oblique node.

Gonosomes, here described for the first time, occur on the Zanzibar specimens. They are of two kinds. The first and most numerous is a small oval type, pedunculate, flat or slightly concave at the distal end, occurring on the proximal part of the main stem and on the pinnæ. Those on the main stem arise singly on the pinnæ below the hydrothecæ, or in pairs immediately above the cauline hydrothecæ. The peduncle is flanked by a pair of sarcothecæ. The total length of this small type is about twice that of the hydrotheca. One specimen, bearing small gonosomes, also carries near the apex of the main stem two large gonosomes, each arising below cauline hydrothecæ which do not subtend branches. The peduncles bear three sarcothecæ, situated either all on the anterior face or two on the anterior and one on the posterior. The length is about six times that of the hydrotheca, while the apex is broad and rounded.

61. *Plumularia corrugata* Nutting, 1900. (51.) (Plate **25**, fig. 17.)

Zanzibar. The colonies assume the form of plumose tufts 1·5 cms. in height and are thus much smaller than Nutting's American forms. Corrugations are present on the stem immediately above and below the nodes. The hydranths are provided with about twelve tentacles and are extended far beyond the hydrothecal margins; indeed, they appear to

be incapable of completely retracting into the cups. Gonosomes resembling the larger type of the American form are abundant. They arise immediately below the stem-processes, which bear the pinnæ, on the anterior face of the stem, not in the axils of the pinnæ, as is indicated by Nutting's figure.

62. *Plumularia crosslandi*, n. sp. (Plate **25**, fig. 18.)

Wasin, 10 fms. Several colonies were obtained growing on an alga. The creeping hydrorhiza gives off erect, unbranched, monosiphonic hydrocauli, which reach a maximum height of 0·9 cm. The hydrocauli are divided by oblique nodes. Proximally each internode carries two pinnæ, distally only one. The pinnæ are alternating, arising from large stem-processes, each of which carries a sarcotheca on the anterior face and a raised perforation just above the axil and is flanked by a pair of cauline sarcothecæ. The pinnæ are much constricted at their origin and are divided obliquely into hydrothecate internodes. The hydrothecæ are completely adnate, the apertures being directed upwards. The margin is produced into two large triangular teeth, lateral in position, while anteriorly it is rounded and is everted to form a lip, below which the wall is strongly thickened to form an internal triangular tooth. The infra-mesial sarcotheca arises from a protuberance below the base of the hydrothecæ, is long and tubular, reaching to half the height of the latter. The lateral sarcothecæ are carried on very slight peduncles and do not reach to the level of the apices of the lateral teeth. An additional mesial sarcotheca occurs above the hydrotheca near the upper end of the internode. The anterior wall of the internode is slightly thickened below the infra-mesial sarcotheca, below the base of the hydrotheca and above the supra-mesial sarcotheca.

Gonosomes arise singly in the axil of a pinna. The peduncles are well-defined and are flanked at the base by the pair of cauline sarcothecæ described above in connection with the stem-process bearing the pinna. In shape the gonosomes are cylindrical, the distal end being drawn out into four irregular expansions, disposed diagonally. An anterior face can be distinguished by the presence of two longitudinally directed ridges, while the posterior wall is smooth.

Measurements: length of internodes of hydrocaulus (proximal) 0·44 mm.; length of internodes of same (distal) 0·21 mm.; length of internodes of pinna 0·25—0·26 mm.; length of hydrotheca (to apex of lateral tooth) 0·13—0·14 mm.; breadth of same at aperture 0·11 mm.; length of infra-mesial sarcotheca 0·085—0·09 mm.; length of lateral sarcotheca 0·04 mm.; length of supra-mesial sarcotheca 0·04 mm.; diameter of hydrocaulus (proximal) 0·11 mm.; diameter of hydrocaulus (distal) 0·10 mm.

63. *Plumularia multithecata*, n. sp. (Plate **25**, fig. 19.)

Zanzibar and Wasin. The colonies assume the form of delicate erect stems, reaching a height of about 2 cms. The stem is monosiphonic, unbranched, divided transversely into alternating long and short internodes. Each of the former bears a hydrotheca and a pinna and each of the latter a pair of sarcothecæ. The pinnæ arise alternately from long stem-processes which are cut off transversely at the distal ends. The first internode of the pinna is short and without hydrothecæ or sarcothecæ; the second is slightly longer and carries a sarcotheca on the anterior face. The remaining internodes are alternately hydrothecate

and non-hydrothecate as in the hydrocaulus. The hydrothecæ are tubular, expanding somewhat in the distal portion. The posterior wall is adnate for about two-thirds of its length, the remainder being free and directed outwards and upwards. Anteriorly the margin is produced into a median blunted tooth, inwardly curved; the lateral and posterior margins are sinuous. In side view, the posterior wall is seen to be compressed into a kind of groove, but this cannot be distinguished in a front view. The aperture is directed upwards and forwards. The infra-mesial sarcotheca is short, scarcely reaching above the base of the hydrotheca, and canaliculate. The lateral sarcothecæ are carried on peduncles which are applied to and extend slightly beyond the lateral walls of the hydrothecæ. The sarcothecæ themselves are very large and canaliculate, the apertures being directed inwards and forwards. The lateral and posterior walls are strengthened by a perisarcal thickening in the form of a U, the cavity of the U being directed towards the base of the sarcotheca. At the point of divergence of the hydrotheca from the internode arises a supra-mesial sarcotheca. This is canaliculate, short and broad, not reaching to the level of the posterior margin, and generally provided with a single aperture. Occasionally however the aperture is double. The cauline hydrothecæ resemble those of the pinnæ except in two points. First, the supra-mesial sarcotheca is always provided with two apertures. Second, the lateral sarcotheca which is on the pinna side is small and carried on the stem-process. The latter therefore corresponds to the peduncle of the opposite lateral sarcotheca. The non-hydrothecate internodes of both hydrocaulus and pinna are similar and carry a pair of canaliculate sarcothecæ on the anterior face. These resemble the infra-mesial in character. Gonosomes absent.

Measurements: length of hydrothecate internodes of pinna 0·25 mm.; length of non-hydrothecate internodes of same 0·09—0·1 mm.; length of hydrotheca (on abcauline side) 0·22—0·23 mm.; breadth of hydrotheca at mouth 0·16 mm.; length of infra-mesial sarcotheca 0·05 mm.; length of supra-mesial sarcotheca 0·03 mm.; length of peduncle and lateral sarcotheca 0·14 mm.; length of sarcothecæ of intermediate internodes 0·045 mm.

64. *Plumularia nova* n. sp. (Plate **26**, fig. 20.)

Zanzibar, on *P. alternata*. A minute epizoic form, the main stem adherent to the stem of *P. alternata*. The hydrocaulus is divided by indistinct nodes occurring at considerable intervals; from each internode, either about the middle of its length or nearer the upper end, arises a short free branch. The branches are obliquely jointed, the first internode quite short, without hydrotheca, the others much longer and bearing small cup-shaped hydrothecæ about the middle of their length. In most cases the branch consists of not more than three internodes, often of only two. The margin of the hydrotheca is even, the diameter of the mouth being about equal to the height. No sarcothecæ or gonosomes are present.

65. *Plumularia providentiæ* n. sp. (Plate **26**, fig. 21.)

Providence, 29 fms. The hydrocaulus is erect, monosiphonic and unbranched, reaching a height of 1·3 cms. The proximal part bears neither sarcothecæ nor pinnæ; distally the hydrocaulus is divided into long internodes by oblique joints. Immediately above the node arises a hydrotheca (immediately below a pinna) from a slight process, the pinnæ being

all on the same side of the stem. In addition, the cauline internodes bear two or three sarcothecæ in a single row on the side opposite the pinnæ. The latter are divided obliquely into long internodes, each of which carries a hydrotheca immediately above the node, then a row of two or three sarcothecæ. The hydrothecæ are campanulate, adnate for about two-thirds their lengths. The margin is even and the aperture directed upwards and forwards. The infra-mesial sarcotheca does not reach above the base of the hydrotheca. Two pairs of lateral sarcothecæ are present; one pair is pedunculate, the peduncles being applied to the wall of the hydrotheca; the second pair is shorter and arises on the inner side of the base of the peduncle of the previous pair. The cauline hydrothecæ are similar in every way to those of the pinnæ. Internal thickenings of the wall of the hydrocaulus occur just above and below the nodes, while in the pinnæ a similar thickening is present below the distal sarcotheca of an internode.

66. *Plumularia quadridentata* n. sp. (Plate **26**, fig. 22.)

Pemba. The colony consists of several long, slender, slightly branched stems arising from a rooting hydrorhiza, and reaching a height of about 25 cms. The basal part of stem and branches is slightly fascicled. Beyond the supporting tubes the stem is faintly segmented by transverse nodes and bears neither hydrothecæ nor sarcothecæ. Pinnæ arising alternately occur at fair intervals. The basal part of each pinna is unsegmented and without hydrothecæ or sarcothecæ; beyond this region oblique nodes occur regularly. Each internode bears about the middle of its length a hydrotheca and immediately behind this a pinnule from a well-marked process. The hydrothecæ of the pinna are subtended by infra-mesial, lateral, and supra-mesial sarcothecæ, and are similar to those occurring on the pinnules, as described below. The pinnæ are divided by regular slightly oblique nodes. The basal one is short, without hydrothecæ or sarcothecæ, the remainder longer, provided each with a hydrotheca and related sarcothecæ. The hydrothecæ are cylindrical in shape, of almost equal diameter throughout, and adnate for more than two-thirds of their length. The aperture is directed upwards and forwards. The margin is provided with four teeth, anterior, posterior, and lateral in position, separated by deep bays. The infra-mesial sarcotheca is short, scarcely reaching the base of the hydrotheca. The laterals are borne on long peduncles and reach well beyond the hydrothecal margin. The supra-mesial sarcotheca is small, not reaching the level of the posterior hydrothecal tooth. Gonosomes are absent.

Measurements: breadth hydrotheca at mouth 0·20—0·21 mm.; length along anterior border 0·23—0·25 mm.; length infra-mesial sarcotheca 0·045—0·055 mm.; length supra-mesial sarcotheca 0·04 mm.; length free portion of lateral sarcotheca 0·09—0·10 mm.

67. *Plumularia setacea* (Ellis), 1755.

Zanzibar.

68. *Plumularia spiralis* Billard, 1913. (30.)

Seychelles, 37 fms. The specimen differs from Billard's description in that the internal thickenings above and below the nodes completely encircle the internodes and are not restricted to the adcauline side. The margin of the hydrotheca is slightly everted anteriorly and the lateral sarcothecæ are longer. An almost complete thickening occurs at the base of the stem-process bearing the pinna. There are present in this position two axillary

sarcothecæ, median raised perforations, while the third sarcotheca is borne higher up on the process than figured by Billard. A single cauline sarcotheca is present between the consecutive pinnæ.

69. *Plumularia wasini* n. sp. (Plate **26**, fig. 23 and Fig. 1.)

Wasin, 10 fms. The colony is in the form of plumose tufts, 3 cms. high. The hydrocaulus is monosiphonic, divided transversely at long intervals; the basal portion is provided with two lateral rows of sarcothecæ. The internodes of the pinnate region carry two lateral rows of sarcothecæ and a varying number of pinnæ, arising alternately. The pinnæ are divided into hydrothecate and non-hydrothecate internodes by alternating transverse and oblique nodes. The non-hydrothecate internodes bear two median sarcothecæ on the anterior faces, except in the case of the first internodes, on each of which only one is present. The hydrothecæ are large, campanulate, free from their pinnæ for more than half their length. The margin is even and the aperture directed upwards and forwards. The infra-calycine sarcotheca is small, not reaching above the base of the hydrotheca; the laterals are pedunculate, the peduncles being applied to the walls of the hydrothecæ, while the sarcotheca itself reaches to the level of the margin. A median supra-calycine sarcotheca occurs at the point of divergence of the hydrotheca from the internode. A triangular thickening of the anterior wall of internode occurs immediately below the infra-mesial sarcotheca, while smaller ones are present on the opposite face of the oblique node and above and below the transverse nodes.

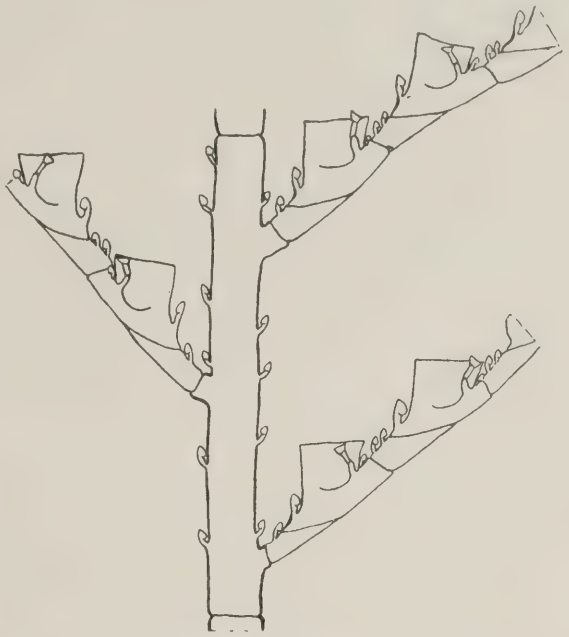


Fig. 1. *Plumularia wasini* n. sp., × 20·6.

Gonosomes arise just below a hydrotheca near the proximal end of a pinna; they are pedunculate, tapering below, and expanding distally. The apertures are broad, circular and flat with single-pieced opercula attached to the adcauline sides. A pair of sarcothecæ is present just above the peduncle on the abcauline surface.

Measurements: length of hydrotheca 0·12—0·15 mm.; breadth of hydrotheca at mouth 0·21—0·23 mm.; length of cauline sarcothecæ 0·09 mm.; length of infra-mesial sarcothecæ 0·08 mm.; length of lateral sarcothecæ 0·07 mm.; length of supra-mesial sarcothecæ 0·05 mm.; length of gonosome 0·7 mm.; maximum breadth of gonosome 9·53 mm.

70. *Antenella secundaria* (Linnæus), 1788.

Cargados, 45 fms.; Centurion Bank, 10—12 fms.; Saya de Malha, 47 fms.; Wasin, 10 fms.

71. *Aglaophenia cupressina* Lamouroux, 1816.

Cargados, 12 and 10 fms., and Zanzibar. The specimen from Zanzibar is much more lax in habit than the remaining colonies. This is due to the fact that the fascicling tubes are less strongly developed and reach only a short distance along the pinnæ.

Much variation is shown in the character of the hydrothecal margin (compare Bale's Australian forms.)

72. *Aglaophenia delicatula* (Busk), 1852. (36.)

Amirante, 35 fms., and Wasin. The aperture from the mesial sarcotheca into the hydrotheca, a point which could not be determined in Bale's Australian forms, is here clearly seen, and is situated immediately below the point of divergence of the sarcotheca from the hydrothecal wall.

73. *Aglaophenia minuta* Fewkes, 1881.

Cargados, 45 fms.

74. *Thecocarpus brevirostris* (Busk), 1852. (36.) (Plate **26**, fig. 24.)

Amirante, 20—44 and 30—100 fms.; Cargados, 45 fms.; Farquhar Atoll, surface; Saya de Malha, 47 fms.; Praslin, reef; Seychelles, 31 fms. With the exception of the Praslin specimens, the colonies differ from the type in the fact that the hydrothecæ are less recurved and in consequence possess apertures which are directed more upwards and less forwards. The mesial sarcotheca is almost constantly much shorter than in the typical form and is provided with a short free portion. In Bale's specimens from Fiji the cauline sarcothecæ are stated to "be provided with a wide free distal margin"; here they almost always possess two distinct openings. The mature gonosome consists of seven alternating costæ on each side and except for the greater size conforms to Bale's description.

75. *Thecocarpus mammillatus* (Nutting), 1900. (51.)

Wasin, 10 fms., and Zanzibar. The trophosome agrees in all essentials with Nutting's description of the American form. The discovery of the gonosome places the species in the genus *Thecocarpus*. The corbula is very long, consisting of about fifteen alternating leaflets on each side. At their origin the leaflets are narrow; a sarcotheca is borne at the point of divergence from the rachis and a second just beyond the origin on the proximal edge of each leaflet. A short distance beyond their origin the leaflets widen out and become partly fused at their edges. A large triangular space is left between the successive leaflets; this is partially closed by a modified hydrotheca in connection with which are a pair of lateral sarcothecæ. Smaller additional gaps are left between the leaflets further from the rachis. The distal border carries a row of five canaliculate sarcothecæ, and, in addition, the lower margin of the proximal pair of leaflets carries a sarcotheca on the outer edge and two more on the lower margin immediately beyond the point of origin. One or two slightly modified hydrothecæ are present on the rachis below the corbula.

76. *Thecocarpus laxus* (Allman), 1876. (2.)

Cargados, 30 fms.

77. *Thecocarpus* sp. Wasin. In the absence of the hydrosome this species cannot be identified with certainty. A single large corbula only is available for examination. It consists of a rachis bearing near the base five consecutive hydrothecæ and beyond these nineteen pairs of alternating leaflets. The basal hydrothecæ are short and broad. The aperture is directed upwards and forwards; the margin has eight blunted teeth, and a small keel is present on the anterior wall; posteriorly the wall is thickened to form an incomplete intrathecal septum. The infra-mesial sarcotheca is almost completely adnate, reaching to about

half the height of the hydrotheca, while the lateral pair do not overtop the margin. The corbula is completely closed except for a slight gap between the basal and second leaflets. Arising from the rachis are, proximally, a fan-shaped appendage bearing usually five sarcothecæ on its upper edge, a hydrotheca of the same size as those on the base of the rachis with a pair of lateral sarcothecæ, of which the one on the distal side is small, and distally, the leaflet, bearing from seven to ten sarcothecæ on the anterior margin. The basal leaflet is smaller than the rest, and bears five rather irregularly placed sarcothecæ on the front edge and three on the posterior. Total length of corbula 7·6 mm. by breadth 1·0 mm.

78. *Cladocarpus alatus* n. sp. (Plate **26**, fig. 25 and Fig. 2.)

Cargados, 30 fms., a single specimen.

The colony is delicate, reaching a height of 10·5 cms. The hydrorhiza is rooting, consisting of a polysiphonic axis which gives off numerous branches, the latter being again subdivided. The hydrocaulus is erect, unbranched, polysiphonic in the proximal portion, the fascicling tubes not completely surrounding the axial, but leaving the latter exposed on the anterior face. A single row of sarcothecæ is borne on the exposed face from a short distance above the base. Pinnæ are restricted to the distal 3 cms. of the stem and are carried on well-marked processes arising from the antero-lateral face of the stem. The processes are provided with a sarcotheca at the base and are cut off transversely at the distal end. Between the pinnæ the stem has about four cauline sarcothecæ in one row on the anterior side. No trace of nodes can be seen.

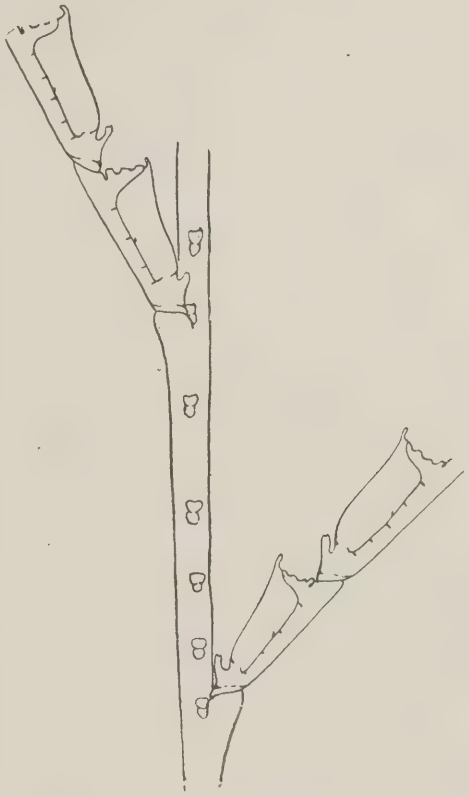


Fig. 2. *Cladocarpus alatus*, × 20·6.

The pinnæ are divided into regular internodes by oblique joints. The hydrotheca is long and tubular, expanding slightly in the distal portion. The margin is provided anteriorly with a large blunted tooth, inwardly curved, while laterally it is obscured by the fusion with it of the lateral sarcothecæ. These sarcothecæ are in the form of large processes arising from the distal part of the internode and reaching in the majority of cases almost to the median tooth of the hydrotheca. On their upper margin they carry near their origin a large aperture, directed upwards and raised above the level of the remainder. Further in, nearer the anterior face of the hydrotheca, are two or three more apertures directed upwards, the innermost one on a level with the hydrothecal margin. The edges of the openings are in all cases crenate. The hydranth thus emerges between two series of sarcothecal apertures. Below the base of the hydrotheca is a single median sarcotheca, not reaching above the base of the hydrotheca, tubular in shape, with a small terminal and a large lateral aperture; the edges of the apertures are crenate. A ring of sharply pointed teeth occurs

round the entrance into the hydrotheca, and a small flap of perisarc is present about half-way up the adcauline wall, projecting into the hydrothecal cavity. The internodes of the pinnæ have from four to seven internal thickenings, one at the base of the hydrothecæ, one at the base of the processes, and two or three in between. Gonosomes absent.

The length of the alate processes is subject to some variation. In the hydrotheca the typical lateral process is developed on one side, while on the other it stops after the second aperture. The lateral margin of the hydrotheca is thus exposed and is seen to be perfectly straight. In another instance the process stops on both sides after the third aperture about half-way along the lateral wall. In several cases the third and fourth apertures are confluent, resulting in a slit-like opening.

Measurements: distance between hydroclade-bearing processes 1·05—1·10 mm.; length of internodes of pinna 0·55—0·6 mm.; length of hydrotheca to base of median tooth 0·38—0·49 mm.; length of median tooth 0·04 mm.; breadth of hydrotheca just above base 0·13 mm.; breadth of hydrotheca at mouth 0·18 mm.; length of mesial sarcotheca 0·05 mm.; length of lateral sarcothecal processes 0·15 mm.; length of proximal aperture of process 0·03 mm.

79. (?) *Cladocarpus plumularioides* n. sp. (Fig. 3.)

Cargados, 30 fms.

The material, which is tentatively referred to a new species, is fragmentary, consisting of a main stem and four pinnæ. The stem is monosiphonic, the distal and proximal parts being absent. Transverse nodes occur at intervals and are obscurely marked. The cauline internodes bear a pinna from a process near the distal end; three sarcothecæ are present between the pinnæ and one always occurs immediately above and in contact with the hydrocladial process. The pinnæ are alternate, divided by slightly oblique nodes; the internodes bear a hydrotheca with infra-mesial and lateral sarcothecæ, also a single median sarcotheca a short distance above the hydrotheca. The hydrothecæ are tubular, long, with a sinuous margin and an anterior blunted, inwardly curved tooth. The infra-mesial sarcotheca is very short, not reaching the base of the hydrotheca, and with a wide terminal aperture. The lateral sarcothecæ are similar in character and do not overtop the lateral margins of the hydrotheca. The internodes are provided with more or less well-developed internal thickenings opposite the bases of the hydrotheca and the lateral sarcotheca and one or two between. In one instance a non-hydrothecate internode, bearing only a sarcotheca, is interposed between two typical internodes.

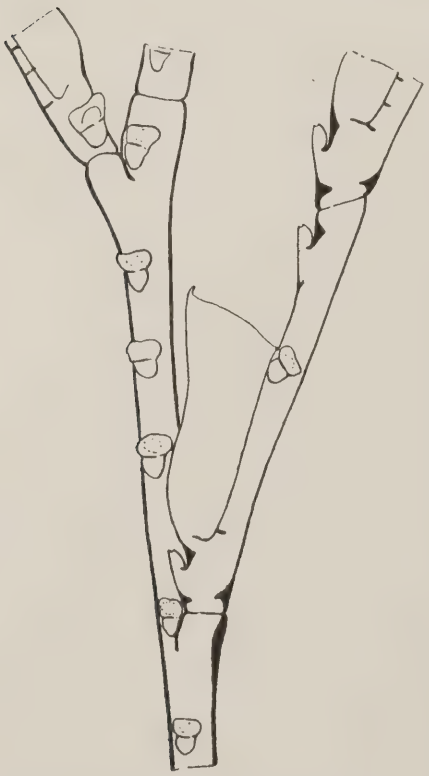


Fig. 3. *Cladocarpus plumularioides* n. sp., × 41·3.

Gonosomes are absent. In the absence of the gonosome this species is referred to the genus *Cladocarpus* on account of the form of the hydrothecæ and the sarcothecæ. It resembles however the

genus *Plumularia* in the presence of a sarcotheca above the hydrotheca on the same internode.

Measurements: length of stem internode 0·85 mm.; length of hydrocladial internodes 0·90—1·15 mm.; length of hydrotheca 0·53—0·62 mm.; breadth of hydrotheca at base 0·08—0·09 mm.; breadth of hydrotheca at mouth 0·22—0·24 mm.; length of infra-mesial sarcotheca 0·12—0·13 mm.; length of lateral sarcotheca 0·11 mm.; length of supra-mesial sarcotheca 0·11 mm.

80. *Lytocarpus hornelli* Thornely, 1904. (65.) (Plate **26**, fig. 26 and Fig. 4.)

Amirante, 25—80 and 29 fms.; Praslin.

The first specimen from Amirante reaches a height of 4·5 cms. The main stem is fascicled for the greater part of its length and bears alternate branches at regular intervals and secondary alternating pinnæ. Transverse sections of the proximal part of the stem show five large tubes and three smaller, the latter being arranged in a tangential series and continued in this manner into the distal part. The most anterior of the three tubes bears pinnæ only, while the branches arise from the larger tubes. The branches are regularly divided by transverse nodes, each node bearing a pinna from a process near its proximal end. Cauline sarcothecæ are present at the base of each stem-process and mid-way between the process and the next node. The hydrothecæ are tubular with their axes parallel to the long axes of the pinnæ. The margin is simple, everted anteriorly and the aperture directed forwards and upwards. The infra-mesial sarcotheca is tubular, with a long divergent portion directed outwards at a wide angle; there are two apertures, terminal and lateral. The lateral sarcothecæ are similar to the infra-mesial and considerably overtop the hydrothecæ. The internodes are provided with two internal thickenings, one opposite the base of the hydrotheca, the other at the base of the lateral sarcothecæ. Gonosomes absent.

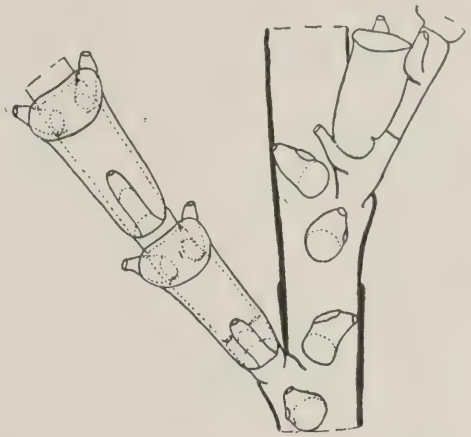


Fig. 4. *Lytocarpus hornelli.* Hydrocaulus and base of pinnæ; hydrothecæ, anterior view; × 41·3.

The specimens under consideration differ from the Ceylon type in the greater length and much greater angle of divergence of the mesial sarcothecæ and in the absence of "strings of nematophores" between the upper branchlets.

Measurements:	Ceylon	Amirante
Length of hydrothecate internodes	0·32—0·35 mm.	0·27—0·28 mm.
Length of entire mesial sarcotheca	0·18—0·2 mm.	0·21—0·22 mm.
Length of free portion of mesial sarcotheca...	0·5 mm.	0·8 mm.
Length of lateral sarcothecæ	0·11 mm.	0·12—0·13 mm.
Length of free portion of lateral sarcotheca...	0·4 —0·5 mm.	0·4 —0·5 mm.
Breadth of hydrotheca at mouth	0·11—0·12 mm.	0·13—0·14 mm.
Length of hydrotheca at mouth	0·25—0·27 mm.	0·24—0·25 mm.

81. *Lytocarpus philippinus* (Kirchenpauer), 1872.

Cargados, 24—35 fms. (in 5 dredgings); Providence, 50—78 fms.; Saya de Malha, 150 fms.; a piece in plankton, off last bank; Zanzibar. As has been noted in previous records, the trophosome is subject to much variation. The Zanzibar colonies especially are noteworthy on account of the small angle of flexure of the hydrothecæ, in consequence of which the aperture is directed upwards more than normally. The character of the hydrothecal margin and the length of the sarcotheca generally show differences in detail. The structure of the gonosome on the other hand is remarkably constant. In the specimen from plankton the internodes are longer than usual and the ends of the pinnæ are produced beyond the hydrothecate portion into long, slender stolons which are slightly swollen at their terminations.

82. *Lytocarpus philippinus* subsp.

Salomon, Chagos. The subspecies is represented by a few broken colonies about 3 cms. high. It differs from the typical *L. philippinus* in the following characters: (1) the smaller angle of curvature of the hydrotheca and the consequent different direction of the aperture; (2) the more strongly developed and longer infra-mesial sarcotheca; (3) the incipient nature of the intrathecal ridge, its development never exceeding that of a thickening of the anterior wall, but this thickening varying in degree in different hydrothecæ; (4) the occurrence of one gonangium only on the phylactocarp, the rachis being short and extending only a little way beyond the gonangium.

83. *Lytocarpus phœniceus* (Busk), 1852. (36.)

Amirante, 22—85, 36, 39 and 12—18 fms.; Cargados, 45 fms.; Praslin, reef; Wasin; Zanzibar. As in previous records, the character of the hydrotheca shows a certain amount of variation in details. In the Wasin form the hydrothecal margin possesses irregular blunted teeth; the lateral sarcothecæ are adnate to the hydrothecæ, with their long axis parallel to that of the mesial sarcotheca. The colony shows a quantity of dark pigment in the tissues. The Cargados specimen most nearly resembles Bale's figure of the variety from Gloucester Passage, but differs in the presence of three internodal thickenings. Three similar thickenings occur in the colonies from Zanzibar, but here the hydrothecal margin is merely sinuous. In the remaining colonies the hydrocladial internodes almost constantly possess two internal thickenings. At the base of each pinna are two sarcothecæ, also a perforation on the stem-process which bears the pinna.

84. *Lytocarpus singularis* Billard, 1913. (30.)

Providence, 50—78 fms.

85. *Halicornaria ferlusi* Billard var. *brevis* n. var. (Plate **26**, fig. 27 and Fig. 5.)

Wasin, 10 fms., four colonies. The maximum height is 18 cms. The hydrorhiza is rooting, monosiphonic, showing branching and anastomosing twigs. The hydrocaulus is erect, rigid and unbranched, and strengthened in the proximal part by upgrowths from the hydrorhiza. These upgrowths are branching and closely applied to the hydrocaulus. Above this region the hydrocaulus is simple, circular in section and with very thick perisarc. The proximal part of the stem is without pinnæ; the cladophores, from which the pinnæ

have fallen, appear as thick-walled, rounded projections, occurring almost to the base of the stem, through the region of the fascicling tubes. The hydrocaulus is regularly divided by oblique nodes, the consecutive nodes slanting in opposite directions and very well marked, giving a rigid appearance to the proximal part of the colony.

Fig. 5. *Halicornaria ferlusi* var. *brevis* n. var. Portion of hydrocaulus and pinnæ, with gonosomes in end view, × 26·6.

The pinnæ are alternating, borne on the stem-processes which arise from the antero-lateral face of the internodes. The processes are provided with three large wing-like sarcothecæ with four or five apertures, the sarcothecæ being anterior, posterior, and ventral in position. The pinnæ are divided by transverse nodes. The hydrotheca is cup-shaped, with the aperture directed upwards and forwards. The margin has a small median anterior tooth and a second similar one postero-lateral in position, while between the two the margin is slightly sinuous. The posterior wall is extremely thick, and the opening into the base surrounded by a ring of pointed teeth. The infra-mesial sarcotheca is completely adnate, overtopping the hydrotheca for a short distance. The distal end is trifid, the median portion being longer than the lateral. The lateral sarcothecæ are in the form of wing-like processes similar to those of the stem and opening by four or five apertures.

Gonosomes arise from the anterior face of the stem-processes which bear the pinnæ. On the entire colony they form two long rows on the front of the stem, their extreme whiteness showing up against the brown of the pinnæ and stem. They are pedunculate, truncate, with the mouth aperture sunken. The mouth is circular, surrounded by a double ring of highly refractive discs.

Measurements: length of hydrotheca 0·23 mm.; breadth of hydrotheca at mouth 0·19—0·20 mm.; length of mesial sarcotheca 0·30—0·32 mm.; length of gonosome 0·85—0·87 mm.; maximum breadth 0·7 mm.

86. *Halicornaria longicauda* Nutting, 1900. (51.)

Amirante, 36 fms.; Seychelles, 20 fms. The colonies show the type of branching described by Ritchie, *i.e.*, a main axis bearing alternating hydrocladia and incompletely surrounded by hydrorhizal tubes which at intervals turn off and become branches. Three cauline sarcothecæ are present at the base of the hydrocladia, two anterior and one posterior in position. The aperture of the hydrotheca is directed upwards and forwards; the margin has distinct teeth, the postero-lateral one being large and directed upwards and outwards. The posterior margin is sinuous. The mesial sarcothecæ are all of the short type of Ritchie, with a thickened anterior wall.

87. *Halicornaria hians* (Busk), 1852. (36.)

Providence, 50—78 fms.

88. *Halicornaria copiosa* n. sp. (Plate **26**, fig. 23 and Fig. 6.)

Amirante, 22—85, 36 and 20—44 fms.; Wasin, 10 fms. The species is represented by several large and well-developed colonies, the largest reaching a height of 26 cms. and an expanse of 20 cms. The main stem and branches are strongly fascicled almost to their extreme ends. The primary branches arise from the main stem at irregular intervals, while the axial tube also bears ultimate pinnules on its anterior face throughout its length. The primary branches give rise to secondary and tertiary ones, while all bear pinnules similar to those carried by the main stem. The ultimate pinnules consist of three or four segments, and arise from distinct processes of stem or branch; these processes are flanked by two sarcothecæ.

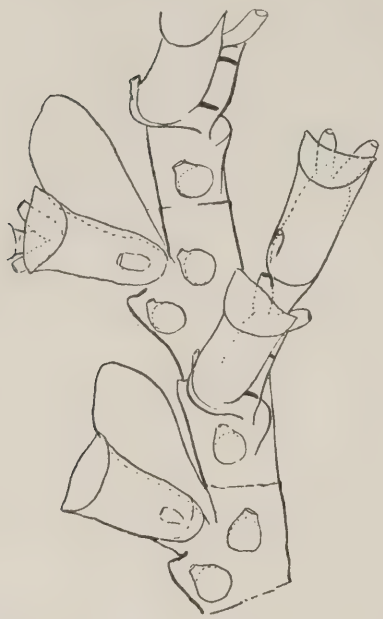


Fig. 6. *Halicornaria copiosa.* Secondary branch, showing pinnules and gonosomes, × 41·3.

The pinnules are divided transversely by very constricted nodes. The hydrothecæ are tubular, with the aperture directed upwards and forwards; the margin of each is provided with a large triangular lateral tooth. The adnate portion of the infra-mesial sarcotheca reaches to about half the height of the hydrotheca, while the divergent portion is very short, with terminal and lateral apertures, and a third aperture into the hydrotheca. The lateral sarcothecæ are tubular, directed upwards and slightly overtopping the hydrothecæ. The internodes are provided with two or three internal thickenings, also a thickening below the base of the hydrotheca on the abaxial side.

Gonosomes arise just above the base of the proximal hydrotheca of a pinnule; they are oval in shape, with indistinct peduncles passing imperceptibly into the body of the gonosome. In the young forms the apex of a gonosome is distinctly convex, but more flattened when older and with an operculum consisting of a single flap.

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EXPLANATION OF PLATES 24—26.

Plate 24.

Fig. 1. *Halecium gardineri* n. sp.
A, × 20·6. B, C, showing varying position of sarcothecæ, × 41·3; D, male gonosome, × 41·3.

Fig. 2. *Zygophlax recta* n. sp.
A, portion of colony, × 16; B, single hydrotheca with two lateral sarcothecæ, × 41·3.

Fig. 3. *Cryptolaria rectangularis* n. sp., × 27·3.

Fig. 4. *Campanularia cheloniæ* Allman, × 20·6.

Fig. 5. *Campanularia corrugata* Thornely, × 20·6.

Fig. 6. *Sertularia brevicyathus* (Versluys), pinnate variety.
A, × 16·6; B, × 20·6.

Fig. 7. *Sertularia marginata* (Kirchenpauer).
A, × 16·6; B, × 20·6.

Fig. 8. *Sertularia turbinata* Lamouroux. End of stolon, × 27·3.

Fig. 9. *Sertularella conica* Allman, var., × 16·6.

Fig. 10. *Sertularella thecocarpa* n. sp.
A, colony showing branch and collapsed gonothecæ, × 27·3; B, gonotheca, × 27·3.

Figs. 11 and 12. *Pasythea heterodonta* n. sp.
11. A, proximal part of colony, × 20·6; B, distal part, × 20·6.
12. Gonosome, × 20·6.

Plate 25.

Fig. 13. *Thuiaria tubuliformis* (Mark.-Tur.). Part of colony from Egmont reef, × 16·6.

Fig. 14. *Diphasia varians* n. sp.
A, colony from Saya de Malha, × 20·6; B, colony from Amirante, × 20·6; C, distal portion of hydrotheca of colony from Cargados, × 41·3.

Fig. 15. *Synthecium dentigerum* n. sp.
A, portion of colony, showing stolon, × 16·6; B, hydrothecæ, × 41·3.

Fig. 16. *Plumularia alternata* (Nutting).
A, small type of gonosome, × 20·6, axillary hydrotheca omitted; B, large type of gonosome, × 20·6, axillary hydrotheca omitted.

Fig. 17. *Plumularia corrugata* Nutting, × 41·3.

Fig. 18. *Plumularia crosslandi* n. sp.
A, portion of hydrocaulus with pinnæ, × 41·3; B, base of pinna with front view of hydrotheca, × 83·3; C, gonosome, anterior face, and D, gonosome, posterior face, × 41·6.

Fig. 19. *Plumularia multithecata* n. sp.
A, hydrocaulus and base of pinna, × 41·3; B, lateral view of hydrotheca, × 83·3; C, anterior view of hydrotheca, × 83·3; D, posterior view of internode, × 83·3.

Plate 26.

Fig. 20. *Plumularia nova* n. sp., × 20·6; on *P. alternata* (Nutting).

Fig. 21. *Plumularia providentiæ*, n. sp. A, × 20·6; B, × 41·3.

Fig. 22. *Plumularia quadridentata* n. sp.
A, lateral view of hydranth, × 20·6; B, anterior view, × 20·6.

Fig. 23. *P. wasini* n. sp.
A, hydrotheca, × 41·3; B, gonosome, × 20·6.

Fig. 24. *Thecocarpus brevirostris* (Busk).
A, specimen from Cargados, × 41·3; B, hydrocaulus and base of pinna, × 41·3; C, corbula, × 20·6.

Fig. 25. *Cladocarpus alatus* n. sp.
A, hydrothecæ, showing variations in length of lateral sarcothecæ, × 41·3; B, lateral sarcotheca with two apertures, × 41·3.

Fig. 26. *Lytocarpus hornelli* Thornely. Hydrothecæ, lateral view, × 41·3.

Fig. 27. *Halicornaria ferlusi* Billard var. *brevis* n. var.
A, hydrothecæ, lateral view, × 40·3; B, hydrotheca, anterior view, × 40·3; C, gonosome, lateral view, × 21·6.

Fig. 28. *Halicornaria copiosa* n. sp. Lateral view of hydrothecæ, × 40·3.

J. T. Rennie Reid, Lith., Edin.

HYDROIDS FROM INDIAN OCEAN.

J.T. Rennie Reid, Lith., Edin.r

HYDROIDS FROM INDIAN OCEAN.

J.T.Rennie Reid, Lith., Edinr

HYDROIDS FROM INDIAN OCEAN.

No. VIII.—DIPTERA: ASILIDÆ, SCENOPINIDÆ, DOLICHOPODIDÆ, PIPUNCULIDÆ, SYRPHIDÆ.

By C. G. Lamb, M.A., B.Sc.
(Communicated by J. Stanley Gardiner, M.A., F.R.S., F.L.S.)

(With Plates **27**—**30**.)

Read 5th May, 1921.

Asilidæ.

The Asilids were submitted to Dr F. Hermann to confirm the identifications. Four of the species are well known; several specimens of a fine species of the Asilinæ were returned marked "genus et species incert."; there is also a single female specimen of a *Laphria* of undetermined species.

Dasypogoninæ.

1. *Leptogaster tenuis*, Loew, Dipt. Fauna Südafrika's, i. 105.

Twelve specimens of this South African species. Seychelles: Mahé; 1907 (Thomasset); Cascade Estate and Forêt Noire district, 1908—9. Aldabra: 1 specimen, 1908—9 (Fryer).

2. *Stichopogon scalaris*, Bigot, Ann. Soc. Ent. France, Ser. 5. viii. 440. 2.

There are eleven specimens of this species, which was described by Bigot from Fiji. Chagos: Salomon, Peros Banhos, and Diego Garcia Atolls (including a pair taken *in coitu*, 12. vi. 1905). Amirantes: Desroches and D'Arros Islands, x. 1905 (including a pair taken *in coitu*, 12. x. 1905). Coetivy: 1 example, 24. ix. 1905.

Asilinæ.

3. *Ommatius pulchripes*, Bigot, Ann. Soc. Ent. France, Ser. 3. vii. 419.

A good series of this Madagascar species. Seychelles: Mahé and Praslin; in Mahé specimens were taken at sea-level and at about 1000 feet elevation (Cascade). Amirantes: Desroches I., 1905. Farquhar Atoll: ix. 1905. Cosmoledo: 1907 (Thomasset).

4. *Ommatius tibialis*, Ricardo, Nat. Hist. of Socotra, 375.

Twelve specimens. Aldabra: 1907 (Thomasset), 1908—9 (Fryer). Assumption I., 1909 and 1910 (Dupont).

5. *?Genus and species.* (Pl. **29**, fig. 21.)

This species belongs to the genus *Asilus* in the broad meaning. Seychelles. Mahé: Cascade Estate and Forêt Noire district, about 1000 feet, 1908—9; also Cascade, 1905 (Gardiner). Silhouette: plateau of Mare aux Cochons, about 1000 feet, ix. 1908.

Laphriinæ.

6. *Laphria*, sp.

There is a single female specimen of this genus which approaches most nearly to *Laphria cyaneogaster*, Macquart, from the Island of Réunion. Seychelles. Mahé: Cascade Estate, about 1000 feet, 1908—9.

Scenopinidæ.

In the *Ann. Mus. Nat. Hung.*, 1913, vol. XI., the above family was monographed by Kröber, the results being also published as the 161st fascicule of the *Genera Insectorum*. Nothing of moment has been added to the knowledge of the family since that date. Among the material are two species belonging to this family, the one from the Seychelles, the other from Aldabra. The latter can be identified with a Cingalese species described by Kröber, the other is apparently new.

7. *Scenopinus longiventris*, Kröber, *t. c.* p. 206.

There is a single male and two females from Aldabra which agree well, as far as the female is concerned, with the above species as described and figured by Kröber, that being the only sex he knew. The specimen described by Kröber came from Ceylon (Colombo). Unfortunately all the Aldabra specimens have the edges of the wings curled over which makes it a little uncertain as to the exact similarity of the venation, but there can be little doubt of the identity of the species as it agrees perfectly with the description, and the figures of the head (Tab. IX. 20, 21), and in the venation, as far as this is visible; the size is also in accordance with the description. But Kröber omits to refer to the remarkable anal flaps which the female possesses. The ante-penultimate segment of the abdomen forms a sort of cup from which proceeds a pair of flaps, which are fully exposed in one of the two specimens, but not so prominently in the other. These are situated dorsally and ventrally, the top one having some conspicuous black hairs on each side of the tip. These appendages are apparently correlated with the very exceptional form of the male abdomen.

The male, on the other hand, agrees very fairly with Kröber's description of *S. tarsalis*, a species from East Africa (*t. c.* p. 196). There is some unexplained discrepancy between the description of the head and the figure of the same (Tab. VIII. 9). In the text he says that the eyes are "auf lange Strecke zusammenstossend," whereas the figure shows a very slight degree of contiguity, only apparently for a few facets. If the text be preferred, the present insect will pass fairly well for that species in colour, size and general structure, except that the anal cell is shorter than shown in the fig. (IX. 64), being practically the same as in the female. The antennæ are crumpled in the same way, and the abdomen has the three bone-white bands of *S. tarsalis*. The pale humeral spot is very inconspicuous and small, the scutellum has no brownish tinge, and the base of the third antennal joint is somewhat rufous. Kröber makes no mention of the remarkable form of the end of the abdomen, and it is thus practically certain that the Aldabra species is not his *tarsalis*, but the male of *longiventris*, which is probably a species nearly related to *tarsalis*. The last segments of the abdomen have the appearance of being compressed or drawn upwards in the axial line of the insect, and in addition the covering hoods that practically conceal the genitalia in the common species, *S. fenestralis*, are completely absent, so that the whole of the genital appendages are visible at the tip of the abdomen; this unusual condition is apparently correlated with the exceptionally large flaps in the female. The genitalia are excessively complex, and could not be described to any advantage without dissection. Externally there are present two stout, inferiorly pointing, fleshy lobes and a median one; these are attached to the lower side of the end of the abdomen, and are densely clothed

with stout white hairs. On viewing the tip of the abdomen in the direction of the axis of the insect, there is visible a remarkable complex of chitinous hooks, etc.

Loc. Aldabra: 1908—9 (Fryer). Ceylon.

8. *Scenopinus balteatus*, n. sp. (Pl. **29**, fig. 22.)

The second species is represented by a single male and a large number of females. It is exceedingly closely related to *S. unifasciatus*, Kröber (*t. c.* p. 195), described in the male sex only, from Greece. The chief difference is in the venation, which differs considerably from that of *S. unifasciatus* as shown in Tab. XI. 58. The second vein is far longer, and the fork of the third vein is much more remote from the wing apex; the wing is shown in fig. 22. The Scenopinidæ are somewhat inconstant in their venation, but the present differences are too large to pass, and taken with other points are sufficient to permit the species to be considered new, though very close to *unifasciatus*.

Male. Head: the eyes approximate for a long distance, namely from just before the front ocellus to half-way down the frons. The ocellar tubercle is black and lightly shagreened, while the narrow strips between the eyes and the facial triangle are very shining and black; the latter triangle is slightly dusted at the points where the silvery pollinated eye-margins join it; just below the tip there is a tiny pit. The face between the eye-margins is also black and shiny, and carries two small circular pits at the top just below the eye-margins. The third joint of the antenna is short and pointed, though the main body of it is plump and rounded, very much as is shown in *t. c.* Tab. IX. 20, though a little less stout; the small second joint is rufous, the third brown-black. The bounding line between the large and small eye facets is quite sharp, and crosses the eyes a little below the level of the top of the face. The hind head is very smooth and is moderately shining black.

The thorax and scutellum are slightly shining and black and excessively finely punctate, with a few sparse and apparently pale hairs on the former; the pleura is the same as the dorsum, but the pale hairs are considerably longer. The hind angle of the humeral knob is slightly orange, and from it a very fine pollinated line extends down to the wing base. All the coxæ and the femora are brown black, the tibiæ are the same at the base, but get more orange towards the tips; the knees are not lighter than the rest; the tarsi are orange except for the slightly infuscate end joint. The halteres are conspicuously clear white with darkened stalks. The wings are clear with yellow veins, and are shown in fig. 22; the second vein ends well ahead of the small cross vein, and the fork arises only a comparatively small distance ahead of the mid-point of the last segment of the third vein. The abdomen is all black, except that the basal segment is somewhat brown. The very narrow silver edge of the third segment just crosses the edge of the segment over the sides. The near half of the abdomen between this line and the base is rather dull velvety black; the terminal part on the other side of that line is shining: the belly is entirely black. The genitalia are concealed as usual in two rounded hoods which are bordered with short pale hairs. Size about 3 mm.

Female: like the male in general colour, etc., except that the abdomen is all somewhat shining black. The frontal eye-margins are nearly parallel, the frons is shagreened all over and has a shallow pit at about the lower third of its length. The breadth of the frons when viewed from in front is about one-sixth of the maximum head breadth, that is to say about two-fifths of the breadth of one eye. Size about 4 mm.

Loc. Seychelles. Mahé: Cascade Estate, 800—1500 feet, 1908—9.

Dolichopodidæ.

This family contains some of the most interesting members of the dipterous fauna of the islands, including a considerable number of new and striking forms. The principal sections of the family are all represented except the Rhaphiinæ, and as might be expected, the Chrysosomatinæ (Psilopinæ) are the most important. The author has had the advantage of being able to submit examples of all the species to Dr de Meijere who has such extensive knowledge of Asiatic Diptera. He returned them with the remark that the majority were unknown to him, and with many helpful hints for which the author desires to record his thanks. The collection formerly made by Bigot, and now in the possession of Mr J. E. Collin of Newmarket, Cambridgeshire, was also very kindly placed at the service of the author by that gentleman, and was helpful in deciding some doubtful points. In addition the collections of the British Museum, both named and unnamed, and the small collection in the Cambridge Museum were carefully collated: but with a few exceptions none of the Seychelles species were represented in these collections. As is usually the case, the older descriptions, lacking as they do all references to points now considered to be of cardinal importance, offered little help unless they contained some casual reference to a striking character or were accompanied by recognisable figures.

The Chrysosomatinæ contain representatives of several of the provisional genera into which the group has been subdivided at various times, such as *Chrysosoma* (*Agonosoma*, *Psilopodinus*), and true *Psilopus*, but no representatives of the sections corresponding to *Megistostylus*, Bigot, or *Margaritostylus*, Bigot, are present. One of the *Chrysosoma* section is somewhat remarkable in that its eyes are excessively pubescent and it also possesses a hypopygium of very unusual form. The single true *Psilopus* is remarkable in having the two last joints of the hind tarsus flattened, a character borne by de Meijere's species *P. lobatus* on the last joint only. An interesting feature of the collection is the presence of a section including six species, all of which agree in the exceptional characters of complete absence of the acrostichal bristles and a very simple form of head in which the vertex is not in the least excavate and the eyes, certainly in the males, are practically touching for a short distance on the face. They appear to form a group which includes Macquart's two species *P. parallelus* and *P. desjardinsi* from Réunion (*D. E.* II. 2. 115). The venation is very like that figured even in small details; all the Macquart species have the abdomen green, but Thomson, *Eug. Reise Ins.* 510, describes briefly a *P. leptogaster* from Mauritius which differs from Macquart's species in having a dull abdomen with lighter side areas. It might even be that the species described below under the name *P. librativertex* is conspecific with Thomson's, but the original description is too slight for certainty. It may be noted that Giglio-Tos, *Ann. Soc. Ent. France*, LXIV. (1895), 359, identifies the only Dolichopid that he had from the Seychelles as being Thomson's species. The Cambridge collection contains a single female specimen of this group from Ceylon; it is exceedingly close to the female of the first three species hereafter mentioned, but is a little darker. This may be a slender clue to show that the real distributional relationship is Asiatic, but until the Madagascar species are investigated nothing can be said with any certainty. There is another undescribed species in the Cambridge collection from Rodriguez which carries the absence of colour to an extreme. It is a very slender,

small species evidently related to the former species, but it has taken on the colour scheme of a *Neurogona*, being almost entirely ochreous with black-banded abdomen. The green is confined to a narrow strip on the thoracic dorsum, a small patch on the præscutellar area, and the brilliant blue scutellum itself. It appears to be related to Becker's species *P. aberrans* from Syria. It is a remarkable fact that the large Abyssinian species, *P. flavicinctus*, described by Bigot, has developed a similar scheme of colour, being extremely like a large *Neurogona* in general facies, but with remnants of metallic colour.

In spite of the great diversity of hypopygial form possessed by these species, it appears probable that they form a more or less natural group. It is worth noting that Psilopids characterised by similarly formed heads and by the absence of acrostichal bristles occur elsewhere; for example, the European species *P. lætus* has these characters, and specimens of a still brighter form from Lagos are in the Cambridge Museum; another case is afforded by Becker's *P. longimanus* from Algeria (*Zeit. f. H. u. D.* VII. 100) which agrees very well in the leg-characters except for the inordinately long front legs in Becker's species. These *lætus*-like species are doubtless related to the Seychelles forms.

An interesting new genus, *Craterophorus*, is highly exceptional in that the male secondary characters take the form of remarkable bulbs on the base of the abdomen, correlated with unique structures at the wing base. Such sexual characters are practically always associated with the peripheral parts of the body, not with its median portion as here.

The true Dolichopodinæ include a species of the cosmopolitan genus *Tachytrechus* and a species of the genus *Paracleius*, which, although known from the tropical regions, has its headquarters in S. America. It also includes two new genera *Argyrochlamys* and *Urodolichus*. The former is quite possibly wide-spread, though not hitherto described, as it is a seashore species. The latter is a very exceptional form, as will be seen from the generic description, but appears to be the local representative of the European genus *Hypophyllus*. The Diaphorinæ are represented by a species of the cosmopolitan genus *Chrysotus*, and two obscure species of the genus *Cryptophleps*. The Hydrophorinæ include *Hydrophorus præcox* which is probably almost cosmopolitan, and a species of the Oriental section of *Sympycnus*.

Dr Hugh Scott has given me the following notes on the habits of Dolichopodidæ in the Seychelles:

"A collector of small insects in the Seychelles can hardly fail to be impressed by the Dolichopodidæ. Among the Diptera they are one of the groups which compel notice by their numbers and also by their beauty. They occur at all altitudes, some species loving sunlight and more open places, while certain others are abundant in the deep shade of the highest zones of damp endemic forest, where Diptera as a whole are little in evidence.

"Very noticeable is the habit which certain species have of settling in particular places, especially on the leaves of particular plants. This is notably the case in the Chrysosomatinæ (Psilopinæ). Howlett also remarked this habit and wrote that 'in India *Psilopus* seems distinctly the dominant genus [of the family] and its members are in some districts extremely common on broad leaves' (*Indian Insect Life*, p. 608 (1909)). At the Mare aux Cochons plateau in Silhouette (Seychelles) the brilliant metallic green *Psilopus bilobatus* was constantly seen to settle, with wings outspread and slanting a

little backward, on the broad leaves of an *Ipomœa* which climbs over trees and bushes: this was in more open places and frequently in blazing sunshine. Higher up, in the shade of the dense forests, one of the most conspicuous forms of fly was the group of duller-coloured *Psilopus*, represented by *P. indistinctus* and certain of its allies. In these slender-bodied and long-legged flies the thorax is metallic green, but the abdomen and underparts are, generally speaking, varied with yellowish, brownish and black. These insects were repeatedly seen to settle on the upper surface of the broad leaves of a low-growing endemic monocotyledonous plant, *Curculigo*, sp., or of *Stevensonia* and other small palms, under the shade of the forest trees: the body is raised high on the long legs, and (as far as I remember) the wings are held rather high above the back, though I cannot recall their position with absolute certainty. This habit was noticed again and again in many parts of the high mountain-forests of Mahé and (to a less extent) of Silhouette, at all seasons from the cooler and much less wet period in September, to the following January and February, when wet and sunless spells were experienced. The stouter-built, metallic, almost blue-black *Urodolichus caudatus* (not a Chrysosomatine) was several times remarked settling on moist places in the red-earthen paths on the plateau of Mare aux Cochons in Silhouette: these paths were exposed to bright sunshine. In the above cases the observations can be referred to particular species, but in others it is not always possible to identify with certainty which species is referred to in my journal. Thus, in the plantation at Cascade (Mahé) in the afternoon of March 1st, 1909, numbers of a metallic Dolichopodid 'varying from emerald green to bronze and yellowish green' kept settling on leaves of Liberian Coffee trees near a cowshed and a dungheap: these were almost without doubt females of *Psilopus leucopogon*. In the same plantation, on the morning of Jan. 3rd, 1909 (during a wet, gloomy spell), numbers of Dolichopodids and of a Stratiomyiid kept alighting on a damp fallen clove tree, off which we had torn some of the bark. They may have been attracted by fermenting juices in the wood, perhaps with a view to oviposition. One more example of the occurrence of some kinds in an environment of humidity and deep shade may be noted: on Jan. 12th, 1909, I recorded 'searching in recesses among boulders at the edge of the forest on the mountain-side (at Cascade), among bushes, &c., catching Dolichopodids and Nemocera in shady places.'

"Another rich type of locality for some species was afforded by open swampy places on the narrow pieces of level land between the foot of the mountains and the beach. A series of the fine and brilliant green *Psilopus leucopogon* was got in such places; some by sweeping rank herbage on patches of drained marsh at Anse Royale, Mahé (20. i. 1909), and others in the long grass at the edges of undrained marshes at Anse aux Pins (21. i. 1909). In the latter case I recorded particularly that there were very few flies (except *Stomoxys*) in the marsh itself, which contained several inches of water and a shoulder-high growth of long rushes and of a yellow-flowered Onagraceous plant (*Jussiæa*); but the marsh-edge grass was rich in Dolichopodids and other Diptera. A series of *Psilopus simplex* and *P. librativertex* came from these same coastal marshes, and one example of *P. magnicaudatus* was taken on a little bit of swampy ground near sea-level at Cascade. Most of the specimens of *Tachytrechus seychellensis* are from a coast-marsh at Port Glaud, Mahé, 5. xi. 1908.

"There are certain species also that were found on the beaches of white coral-sand: the silvery-grey *Argyrochlamys impudicus*, taken only on the beach at Long Island (Mahé, vii. 1908); and *Psilopus lasiophthalmus*, found on the same beach and at the same time, but also taken afterwards at an elevation of about 1000 feet on the plateau of the Silhouette Mare aux Cochons, far from any sand. The coloration of the latter species is peculiar; it is metallic green, but in the female the surface is dusted over with silvery grey, so that it is intermediate between bright green forms like *P. bilobatus* and the silvery *Argyrochlamys*: in the male the silver dusting is much less, and the insect is scarcely less bright green than its congeners. One is tempted to think that while the duller-coloured forms like *P. indistinctus* may be adapted to the shade of the high forests; while the bright metallic green species may be suited to the more sunlit vegetation which they frequent; while the all-silver *Argyrochlamys* conforms to the same colour-scheme as many other sand insects, both littoral and desert-haunting, of several Orders; that the intermediate coloration of the female *P. lasiophthalmus* may be suitable for the two types of locality in which the species was taken, namely sandy beach and sunlit vegetation. It should be added, however, that I did not experience, consciously at any rate, any difficulty due to cryptic coloration in seeing either the shade-loving or the bright metallic green species. The metallic green of the latter is frequently conspicuous against the non-metallic green of the leaves on which they sit. Concerning the sabulicolous forms I cannot recollect whether they were specially hard to see or not.

"Turning for a moment from the Seychelles proper: the only species of Dolichopodidæ captured in Aldabra were *Hydrophorus præcox* and *Thinophilus*, sp., both found by Fryer (at Takamaka) running on the surface of a well, almost the only fresh water on that inhospitable atoll. Dolichopodids with this habit were not taken in the Seychelles.

"From what has been said it follows that certain species were found in cultivated country near sea-level, and some only in the endemic forest at high altitudes; but some kinds occur in all types of country. It is instructive to summarise the local distribution within the Seychelles of the Chrysosomatinæ. *Psilopus leucopogon* (taken also in the Chagos Islands and Rodrigues, and known from India, Ceylon and Java) was found in the coast-marshes of Mahé, and also at nearly 1000 feet in Cascade Estate, but probably in the latter place only in the plantation, not in the wild forest. Of *P. pallidicornis*, described from the Hawaiian Islands, only three examples were taken, each at about 1000 feet, in three different islands. *P. simplex* (taken also in the Amirantes, and described originally from Java) was found only near sea-level. The foregoing are all known from other countries besides the Seychelles*, the following hitherto only from the Seychelles proper. *P. lasiophthalmus*, n. sp., as mentioned above, occurred on the beach but also at 1000 feet. *P. bilobatus*, n. sp., occurred in a low coral-island, Dennis I., an outlier of the true Seychelles, in Félicité, and in Mahé and Silhouette at elevations up to 1500 feet. The group of new species containing *P. pollicifer*, *indistinctus*, *grandicaudatus* and *amplicaudatus* is typical of the highest endemic forests, up to the loftiest peaks: these insects should almost certainly prove to be endemic. Seventy-nine examples of *P. indistinctus* and *P. pollicifer* together were got, all from high elevations and with few exceptions all

* Cf. remarks at bottom of p. 370.

from right within the forests. Even in this group, however, there are some exceptions to the high-altitude habitat: most of the specimens of *P. librativertex*, n. sp., and one example of *P. magnicaudatus* being from swampy places at low levels. The remarkable new genus *Craterophorus* was collected exclusively at high elevations, and almost all the specimens are known to have been taken in the forests, though a few may have occurred in cultivated places near them. Most remarkable is the case of *C. mirabilis*, represented by four examples, all from the summit of Mount Sebert (Bayonne Mt.) in Mahé. This was a most distinctive spot: a bare granite glacis at nearly 2000 feet elevation, in the fissures of which were patches of stunted forest growth, purely endemic and including one or two plants known in a wild state from only one single example apiece. It is worth noting also that the great majority of specimens of the presumably endemic group of *Psilopus*, and all those of *Craterophorus*, are from Mahé. This may be due mainly to the greater length of time spent in Mahé, or to my increased experience in collecting: but it may also be partly seasonal; the months spent in Silhouette, August and September, being the coolest and least wet part of the year, while those spent in Mahé are hotter, and—especially December, January, and February—much wetter."

Chrysosomatinæ.

In *Nova Acta*, Halle (104, 1919, 136), Professor Becker has given a very clear account of the vexed question of the synonomy of the group hitherto known as the Psilopinæ or Sciapinæ, and it appears to be quite certain that the best name for the sub-family is that given above. With some apparent inconsistency the present author, however, has retained the old and well-known name *Psilopus* for the insects under review. In spite of many efforts made to attain a natural division of the great mass of species appearing under the name *Psilopus*, no generic, or even subgeneric, divisions have so far been proposed that are other than highly artificial and indeed sometimes inconsistent. Excluding the species which lack the forked vein, the venation is very uniform in general character, but it exhibits certain definite types which indicate the existence of sections in the genus; these types however cannot so far be correlated with the important antennal and other characters of which the family exhibits an immense variety, some of which indeed are peculiar to it. Among the present insects some can be assigned to the genus *Chrysosoma* (*Agonosoma*) with certainty, and the last species could be allotted to the genus *Sciopus* (Zeller, emend. Becker), that is to say to the old true *Psilopus*. But in view of the present unsatisfactory state of the classification the author preferred to retain the old generic name for all the species, trusting that the descriptions would be full enough to enable the insects to be duly allotted to whatever genera future workers may succeed in delimiting in the sub-family.

9. *Psilopus leucopogon*, Wiedemann. (Pl. **27**, fig. 1; Pl. **29**, fig. 23.)

There can be little doubt that the above species of the *Chrysosoma* group is represented by a fairly long series in the collection. The specimens agree well with Schiner's description in *Novara Reise, Dipt.* 215, 17, but neither he nor Wiedemann mention the remarkable pit or brand on the hind tibia, though Schiner refers to a local

thickening, and both refer to the darkened base. This pit also occurs in Bigot's Ceylon species *P. armillatus*. The description given by him (*Ann. Soc. Ent. France*, t. x. 285, 6) is quite inadequate, and makes no mention of the pit, but the collection in the possession of Mr J. E. Collin has in it one of Bigot's original specimens, and this shows that *P. armillatus* is very similar indeed to *P. leucopogon*; it is a little slighter in build, and is devoid of the striking colours of the mid-tarsi, though it has a remarkable row of regularly bent tiny bristles below on the first tarsal joint of those feet. The wings have the fork of the fourth vein shorter and more bowed; the pale part of the legs is more ochreous, and the white silky fringes are present. The remarkable pit possessed by these two species appears sporadically in diverse families of Diptera; it occurs again in the Dolichopids in an undescribed Queensland species in the British Museum collection which belongs to Bigot's section *Margaritostylus*; this is probably nearly related to *P. patellifer*, Thomson, as according to Grimshaw (*Fauna Haw.* II. 1) that species also possesses a similar pit. In view of there being possibly several closely related species in the *leucopogon-armillatus* group of *Chrysosoma*, it is thought best to leave the description in full as originally drawn.

Head (fig. 1 *a*, *b*): vertex much excavate with prominent brassy tubercle; the whole is entirely brilliant blue-green, the orbital margins being grass-green. There is a single pair of black convergent vertical bristles, the place of the front one being taken by a diffuse area of fine pale hairs. The ocellars are strongly divergent but are vertical in the plane transverse to the head. The face is coloured like the vertex, but the lower part is somewhat flattened and rather silvery, as is the labrum. The orange palpi bear a long black side bristle and a smaller one at the tip; the proboscis is orange. The hind orbits are silvery and the upper half of the post-orbital row consists of very tiny black bristles which merge into the dense long white silvery hairs which form the beard. The antennæ are entirely black, the first and second joints being small, the latter with the usual long bristles above and below; the third joint is conical and about as long as the other two together with a long simple terminal arista.

The thoracic dorsum is somewhat shining, but not brightly so, and is of an intense golden green a little dusted in front. The acrostichal row consists of three pairs of very large bristles preceded by rows of tiny ones on the front of thorax. The dorsocentral rows consist of four tiny hairs succeeded by two very long stout curved bristles; the rest of the chaetotaxy is normal; all the bristles are stout, long and black. The scutellum is coloured like the thorax, half-moon shaped in profile and rounded in vertical section; it carries the normal pair of long bristles inserted about half way between base and tip, and between each and the base is a smaller bristle. The pleura is entirely suffused with silvery grey dust through which the greenish body colour shows. The wings (fig. 23) are clear with dark brown veins but are yellower just at the base. The squama consists of a tiny dark knob with very delicate white fringes. The halter is long and slender with a whitish stalk and a yellower head.

Front leg: the coxa and two-thirds of the femur are black, the rest being yellow. The coxa is covered in front with profuse white hairs, those at the tip becoming bristly; femur with long white hairs in front of which some five or six are outstanding from the rest like extremely long, fine bristles: tibia with three superior bristles, the last being a

little beyond the middle: the first tarsal joint carries two superior bristles near the middle, the basal two-thirds is remarkable in being covered beneath with a dense mat of tiny hairs, and the clothing bristles form a close posterior pectination along the same: the remaining joints are normal, and a little darkened. Lengths in mm.: femur 1·6, tibia 1·6, first tarsal 1·4, rest 1·1. Middle leg: coxa greyish with silvery hairs, femur quite black except at extreme tip; it is spindled, grooved longitudinally in front, and has a sparse fringe of long pale hairs; the tibia is pale except at the extreme tip and has two small anterior bristles; the first tarsal joint is pale with its tip quite white, but the junction with the following joint dark; below it carries a beautiful regular pectination the bristles of which are about as long as the joint is deep; the second and third joints are black with a similar pectination; fourth joint brilliant silvery with an upstanding pad of silvery hair which causes it to appear swollen; fifth joint also silvery with black claws. Lengths in mm.: femur 2, tibia 2·8, first tarsal 2·5, rest 1·2. Hind leg: coxa grey with long silvery hairs; femur all black with a double row of long straight silvery hairs; tibia pale except at tip, near the base behind is a remarkable swelling on the otherwise simple joint, which is darkened; it looks like a "brand" and when viewed posteriorly is seen to contain a long deep oval pit the margins of which are set with sensory hairs; the only bristle is a small superior one about two-thirds down; the darkened tarsi are quite simple. Lengths in mm.: femur 2·2, tibia, 3, first tarsal 1·5, rest 1·5.

The abdomen is the same in colour as the thorax but is a little more shining. At the extreme base are the usual two large bristles on the side and a profusion of white hairs; the whole venter is similarly shaggy, which shagginess extends over the sides of the basal segments. Each segment on its disc carries about six small bristles, and marginally each has about six very long curved ones. The hypopygium is shown in fig. 1 *c*; it is black with shaggy white hairs on the eighth segment, and short white pectination on the lobes.

The female differs to some extent. It possesses the second front vertical and normal dorsocentrals; the leg pectinations are much shorter; the abdomen is more dull brassy, and the leg bristles more numerous and stouter.

Size a little over 5 mm., excluding antenna and hypopygium.

Loc. Chagos: Salomon and Peros Banhos atolls, v. 1905, 4 ♂; marked "common" (T. B. Fletcher). Seychelles: Mahé, Cascade Estate, about 800—1000 feet, and marshes on the coastal plain at Anse aux Pins: Long Island, vii. 1908: 5 ♂, 24 ♀. This species also occurs in Rodriguez (1918, Snell and Thomasset), India, Ceylon, and Java.

10. *Psilopus pallidicornis*, Grimshaw, Fauna Hawaiiensis, III. 12. 2.

A single male and two females can be referred without doubt to this species. The male agrees exactly with Grimshaw's description and figures, possessing the same remarkable compressed abdomen and clouded wing tip: the frons has no hair tuft, and the presutural dorsocentrals are normal. Suspicion was aroused by the presence of so striking an insect in localities so far apart as Hawaii and the Seychelles, and the author communicated with Dr R. C. L. Perkins, F.R.S., on the question. He informed the author that one of the large Hawaiian Dolichopids had turned up in localities at a great distance from the islands, and that he considered these insects to be non-indigenous to Hawaii. He had himself

bred Dolichopids, quite probably including the present species, from damp earth in which plants were being reared for use in Hawaii. It follows that no stress can be laid on the distribution of the species, and indeed doubt is thrown on other similar cases.

The female was not known to Grimshaw. The breadth of the head is considerably less than in the male but the antennæ are exactly the same. The thorax is metallic blue-green only on the dorsum, the scutellum and the epipleura; all the sides of the dorsum, the front, and the pleura are orange. The front femur is quite devoid of the stout bristles usually found there, and the leg bristles are more developed, the mid tibia having two evident bristles of the inferior row, and the rows on the hind tibia being much stouter than in the male. The abdomen is predominantly orange like the thorax, but the second and third segments are broadly metallic on the disc, the fourth narrowly so, and the end of the abdomen almost completely æneous : it carries a pair of small black cerci.

Size about 5 mm.

Loc. Seychelles. Silhouette : plateau of Mare aux Cochons, over 1000 feet, ix. 1908, 1 ♂. Mahé : Cascade Estate, about 1000 feet, 1 ♀. Praslin, xi. 1908, 1 ♀. Also known from the Hawaiian Islands.

11. *Psilopus simplex*, de Meijere, Tijds. v. Ent., liii. 1910, p. 99.

There are about a dozen female specimens which Dr de Meijere considers are best referred to this species, at least provisionally. Amirantes: Eagle I., 17. x. 1905, 1 example. Seychelles: Dennis I., viii. 1908 (Fryer), 1 example: Mahé, coast-marshes at Anse aux Pins, i. 1909, 9 specimens. Found only in places near sea-level, among wide-spread forms of vegetation. Described from Java (Semarang).

12. *Psilopus lasiophthalmus*, n. sp. (Plate **27**, fig. 2; Plate **29**, fig. 24.)

This species differs from most *Chrysosoma* forms in having a true front vertical bristle and normal dorsocentrals present in the male. It is remarkable, indeed almost unique, in having the eyes densely pubescent, and is almost sufficiently distinct to form the type of a subgenus.

Head (fig. 2 *a*, *b*): vertex fairly excavate; frons bright shining violet-green. Face the same but more suffused with golden dust, especially when viewed obliquely; the labrum is not so long as usual, being about equal in breadth and height. The palpi are orange with a bristle pair smaller than usual, and the tongue is also orange. The front vertical is present, and behind each bristle, and on the vertical ridge, stands a pair of equal bristles, which form the base of an isosceles triangle of which the upper is the apex. The ocellars are moderately long. The hind head is blackish-green dusted behind the eyes; the post-orbital row is black and succeeded by fine, white, silky bristles which merge into the beard. The eyes are densely though shortly pubescent. The antenna is dusky orange, the first and second joints are normal, the latter with the long upper and lower bristles; the third is pointed, egg-shaped, with a simple black almost apical arista having swollen basal joints; it is about 0·9 mm. long.

The thoracic dorsum is shining green with violet reflections, especially behind and on the scutellum; there are short coppery lines between the dorsal and acrostichal rows. The acrostichals consist of two pairs of long bristles, not regularly inserted, continued by the two

rows of tiny bristles on the front of the thorax. Including the prescutellars there are four dorsocentral pairs; the other bristles are normal and all of them stout and black. The scutellum is rounded in profile and section and has only the pair of long terminal bristles, inserted as usual. The pleura is somewhat dull and dusty green. The wings (fig. 24) are slightly suffused, with brown veins, and are paler at the base. The squama has a white fringe in the form of a fan. The halter is orange with slightly darkened stalk.

The legs are all orange except the coxæ of the middle and hind pairs, and the last tarsal joints of the same, which are blackened. Front leg: coxa with pale hairs, three side bristles on anterior edge, a terminal process made up of a few stout blunt pale bristles more or less confluent: femur, spindled: tibia with a posterior bristle at the middle: first tarsal joint with a dense pad along the plantar surface: other joints simple; length in mm., femur 1·3, tibia 1·2, first tarsal 0·7, rest the same. Middle leg: femur spindled: tibia with a large anterior bristle at the upper third and a smaller one at the second third, together with a crown of one long and a few small bristles: tarsi simple; lengths in mm., femur 1·3, tibia 1·3, tarsal 1·0, rest 0·7. Hind leg: all the joints are simple, the tibia carries a small end bristle; lengths in mm., femur 1·25, tibia 1·8, first tarsal 0·9, rest same.

The abdomen is silvery at the extreme base and carries the usual long side bristles with white hairs below; the disc of the segments has the basal half of each very dark æneous purple-black, which rapidly merges into a distal æneous green part, so that the general appearance is that the abdomen is cross-banded with black. All the segments have dark bristles on the disc and sides and, exceptionally to the common rule, the marginal bristles are hardly differentiated from the discals. The hood of the hypopygium (fig. 2 *c*) is dark æneous with long pale yellow appendages. The venter is all dark.

The female is very like the male, but the front femora bear the long spines so usual in the genus.

Size, without antenna, etc., $4\frac{1}{4}$ mm.

Loc. Seychelles. Silhouette: Mare aux Cochons plateau, over 1000 feet, ix. 1908, 3 ♂. Long Island, on beach, vii. 1908, 8 ♂, 10 ♀. The latter place is a small islet the vegetation of which is nearly all non-endemic; the Silhouette locality is about at the meeting-point of cultivation and endemic forest.

13. *Psilopus bilobatus*, n. sp. (Plate **27**, fig. 3; Plate **29**, fig. 25.)

This is apparently a true *Psilopus*, although it possesses the hair tuft instead of the vertical bristle, and the evanescent dorsocentrals characteristic of many true Chrysosomatinae, but the antenna has an absolutely dorsal arista.

Head (fig. 3 *a*, *b*): very excavate with a strong tubercle; the frons is grass-green or violet-green and very shining; the hind verticals are remote from the eye-borders, and the front bristle is replaced by about seven hairs scattered over the broad triangular eye-margins. The ocellars are long and black and divergent, there is also a tiny pair of bristles on the back of the knob. The face is the same colour as frons, but a central area bounded by a curve from the antennal bases is dusted with silver, this dust being much stronger on three vertical lines on that area; the labrum is similarly dusted all over. The orange palpi have small side and end bristles; the tongue is orange. The post-orbital row of tiny

black bristles merges into the usual profuse white-haired beard; the hind head itself is black. The antennæ are all black, all three joints being roughly the same in size; the second carries the usual upper and lower bristles; the third is quite rounded, oval, and carries a simple slender dorsal arista which is about as long as the eye-depth.

The thoracic dorsum is a somewhat dull violet-green with indistinct more shining greenish stripes between the acrostichal rows and between them and the dorsocentrals. The acrostichal rows consist of three large pairs with tiny bristles in front; the first three dorsocentrals are reduced to hairs, with two large ones behind them on each side; the other bristles are normal. The scutellum resembles the dorsum and is rounded in profile and section; it only carries a single pair of large bristles. The pleura is slightly suffused æneous green. The wings (fig. 25) are very faintly suffused, with brown veins; the squama is a tiny tubercle with long black fringes. The halter is long with orange head and slightly darkened stalk.

The legs are entirely yellow, except for the black coxæ and trochanters and slightly suffused tarsi of the hind and middle legs. Front leg: coxa with pale hairs; femur with an inferior row of fine black bristles and a posterior row of fine white ones; tibia with one long inferior bristle beyond the middle, and a small one just remote from the tip; tarsi quite simple; lengths in mm., femur 1·3, tibia 1·3, first tarsal 0·8, rest the same. Middle leg: coxa pale haired; the joints practically devoid of bristles except for three tiny anterior ones on the tibia; tarsi quite simple; lengths in mm., femur 1·5, tibia 1·7, first tarsal 1·2, rest 1·4. Hind leg: coxa pale haired; femur with a row of about seven bristles on the basal half below; tibia with about five very small superior bristles and two or three inferior; tarsus with the last two joints distinctly dilated and flattened (fig. 3 *d*); lengths in mm., femur 1·8, tibia 2·8, first tarsal 1·2, rest same.

The abdomen is green or violet-green and fairly shining, each segment is more or less bordered with black which is more distinct in the violet specimens; the narrow basal segment bears the usual pair of long bristles each side with profuse white hairs below them, while similar hairs extend all along the venter. Each segment bears black bristles on the disc and sides, and carries four long marginal bristles just remote from the black borders. In the darker specimens the dark borders on the sides of the terminal segments are very wide. The hypopygium (fig. 3 *c*) is black except for the orange lobes, which are black haired.

In the female the front vertical and the normal dorsocentrals are present. The front bristles on the front coxa and the lower ones on the front femur are large as usual. The legs have the same general chætotaxy as in the male, but stronger. There are no fringes to the legs.

Size, without antenna or hypopygium, about 4 mm.

Loc. Seychelles. Dennis I., viii. 1908 (Fryer), 9 ♂, 3 ♀. Silhouette: from near coast, 2 ♂; Mare aux Cochons plateau, over 1000 feet, and near Pot-à-eau, about 1500 feet, 8 ♂, 14 ♀. Mahé: marshes on coastal plain at Anse aux Pins, i. 1909. Félicité: xii. 1908, 1 ♂. Near Morne Blanc, and Cascade Estate, both about 1000 feet. Distributed from sea-level up to the high endemic forest.

The following species form the group referred to in the introduction as remarkable in being completely devoid of acrostichal bristles, and in having simple head characters.

The head has the shape shown in fig. 5 *a*, *b* of *P. pollicifer*; these may be regarded as applying broadly to all the species. The insects are rather fragile and the great majority of the specimens have the head more or less deformed owing to shrinkage, so that it is not possible to give drawings of each species. The vertex is almost level, with a well-marked though small knob; the eye profiles of the head and face are quite continuous, and the eye-margins gradually approach till they meet below the antenna: the eyes are then either absolutely confluent along the mid-line or only separated by the narrowest margin; below, the tiny labral triangle is alone visible. The eyes are quite bare. The antennæ have the simplest structure; the second joint bears only small upper and lower bristles, the third is egg-shaped with a simple arista inserted dorsally near the lower part of the joint. The bristles present vary to some extent; the thorax is absolutely devoid of acrostichal bristles, the area between the dorsocentrals being quite smooth and shining. The venation of all the species is very similar, the principal difference arising in the degree of approximation of the ends of the third vein and the fork of the fourth; this character is subject to a small degree of variation, and hence can only be relied on for the first species. In such species as are metallic, this colour is practically absent from the abdomen. The females are so extremely close as to be almost inseparable, and indeed are probably completely so in *P. pollicifer* and *P. indistinctus*, in which the males differ in one single but quite major tarsal character. The hypopygium has two main forms; in the earlier species given below it is comparatively small, but in the last three species it is swollen to an extraordinary degree, and that of the last species is almost unique in its monstrous size, and the number and complexity of the processes.

14. *Psilopus librativertex*, n. sp. (Pl. **27**, fig. 4; Pl. **29**, fig. 26.)

Head with very brilliant grass-green vertex: in some of the better preserved specimens it is just possible to glimpse a very tiny bristle near the orbit about two-fifths down from the vertex to the antenna, which probably represents the front vertical; otherwise fig. 5 will do well for this species. The apparent post-vertical is inserted exactly in the line of the post-orbitals, and the stout ocellars point outwards and backwards. The triangle below the antennæ is silvery as is the labral triangle. The minute orange palpi have each a small black bristle, and the tongue is also orange. The hind head is black with grey suffusion; the small black bristles of the post-orbital row are succeeded by longer white ones which merge into the long sparsely distributed bristles which take the place of the usual hairy beard. The first two antennal joints are pale ochreous, the third and the flagellum are very dusky.

The thoracic dorsum, including the scutellum, is shining green with rather faint reflections of blue and gold. As said above there are no acrostichals, but there are a few bristles belonging to the tiny rows on the front of the thorax. The dorsocentrals, including the pre-scutellars, number five; the scutellum is rounded in profile and section and carries two bristles inserted half-way, which are stout and only converge a little towards the tip. The wings (fig. 26) are very faintly suffused, and the end of the third vein and the fork of the fourth are nearer than in all the other species. The squama bears a fringe of about six fairly long golden hairs; the halter is all pale.

The legs, including the coxæ, are yellowish white except for a definite suffusion on the upper surface of the last half of the hind femora, which is a very distinct feature: the tarsi are more or less dusky towards the end. Front leg: coxa with short pale hairs in front; towards the tip on the anterior surface are two nearly straight spines, these appear to be a good specific character; femur, a little spindled in the basal half; the last tarsal joint is deep black, and though scarcely larger than usual, appears to be flattened; lengths in mm., femur 0·8, tibia 0·9, first tarsal 0·85, rest 0·9. Middle leg; the only bristles present are two small superior ones at the first and last thirds of the tibia and a tiny crown to the same; lengths in mm., femur 1·0, tibia 1·5, first tarsal 1·0, rest 0·85. Hind leg: the only bristles present are on the tibia, being two small superiors, one at the middle, the other half-way between it and the tip, and a few tiny bristles of the inferior row; lengths in mm., femur 1·3, tibia 1·8, first tarsal 0·6, rest 1·1.

The abdomen is mostly blackish, the basal segment being pale with a fringe of long black hairs, four on each side, and a scattered row of pale ones below, where the pubescence is usually found. The whole abdomen is dark haired and there are no distinct marginal bristles. If the abdomen is viewed sideways, a very faint greenish shine can be seen, and the last two segments are almost as fully æneous as in the ordinary Dolichopid. In side view the sutures between the segments from first to fifth are seen to be widely banded with blackish, leaving the mid-areas ochreous. The hypopygium (fig. 4) is dark chitinous with tiny orange flaps.

The female has the face below the antenna of almost equal breadth throughout, namely the amount just below the antenna: this is the case with the other species as far as is known. The face is brilliant blue-green thickly suffused with dust. The stout coxal and femoral spines are present: the mid and hind coxæ have a single bristle outside; the colour is like that of the male. This is the only female clearly separable by its venation.

Size, excluding antenna, etc., just over 3·5 mm.

Loc. Seychelles. Mahé: marshes on coastal plain at Anse aux Pins, i. 1909, 6 ♂, 2 ♀; Cascade Estate, about 1000 feet, 2 ♂, 2 ♀.

The next two species are practically undistinguishable from one another except for the very aberrant front tarsal joints of the first species, and some slight differences which will be given under the second species. The description was drawn up point by point with both species under comparison, to ensure accuracy. The body characters are the same as are the hypopygia, and the lengths of the leg joints practically agree within the limit of error of the measurements, the only appreciable difference being that the first tarsal joint of the front legs of the first species occupies a little more of the total length of the tarsus, which has the same length in both species*. As a consequence of the close affinity of the males, it is impossible to separate the females.

15. *Psilopus pollicifer*, n. sp. (Pl. **27**, fig. 5; Pl. **29**, fig. 27.)

Head as figs. 5*a* and *b*. The frons is silvery, as is the facial triangle above and the labral one below. The small front vertical bristle bends forward and the hind one is just at

* Compare a quite analogous difference separating two forms of Phalacrid beetles, *Nesiotus tropicus* and *N. similis*, found in the Seychelles. In this case the differentiating character lay in the female sex, and in the hind tarsus. See pp. 237–9 of this volume.—H. Scott.

the angle of the eye; the divergent ocellars point a little backwards. The orange palpi bear a small bristle, the tongue is also orange. The antennæ are all dullish orange with the structure described above (p. 374). The hind head is black and dusted, with a tiny black post-orbital row succeeded by the long white post-oral bristles.

The thoracic dorsum is polished shining green including the acrostichal area; there are four dorsocentrals including the pre-scutellars. The scutellum is like the thorax; rounded in profile and section with a single pair of side bristles which project sideways, that is to say, are somewhat divergent; they are inserted midway along the sides. The pleura is dullish black. The wings are as shown in fig. 27, and are a little smoky: the squamal hairs are long and of a golden brown colour, spread out like a half closed fan; the halter is orange.

The legs, including all the coxæ, are quite pale. Front leg: coxa haired and ending in a long thin thorn sharply hooked at the end; femur sharply spindled in the basal half, the distal half very thin and delicate, with a pair of fine thorns beneath at the base: tibia thin like the last half of femur: first tarsal joint long, with a regular distant pectination on the apical half (fig. 5*c*): the last tarsal joint has a very remarkable structure (fig. 5*d*), it is dilated and twisted, and carries a small side process like a thumb; lengths in mm., femur 1·1, tibia 1·1, first tarsal 1·55, rest 0·7. Middle leg: coxa with a few pale hairs on the front, the tip ends in a regular dense tuft of pale hairs that have the appearance of a sea anemone; femur simple and but slightly spindled at the base; tibia with a tiny bristle on the upper third and a single crown bristle; tarsus simple; lengths in mm., femur 1·1, tibia 2·1, first tarsal 1·55, rest 1·1. Hind leg: coxa with outer bristle; tibia with a few tiny bristles of the superior row; lengths in mm., femur 1·6, tibia 2·6, first tarsal 1, rest 1·3.

The whole abdomen is blackish with a suspicion of shininess (in side view) here and there; pale on sides and venter except just at the tip. The basal segment is strongly fringed on the sides with long golden bristly hairs; the other segments bear similar hairs on the sides which get smaller towards the end of the body. All the dorsum is sparsely haired with dark hairs, and there are no true marginal bristles. The hypopygium is shown in fig. 5*e*; it bears tiny orange flaps.

The female has the eyes separated as in the previous species; it has the usual stout front coxal and femoral spines: the pleura is all orange.

Size, less antennæ, etc., about 4·5 mm.

Loc. Seychelles. Mahé: Cascade Estate, and Forêt Noire district, both about 1000 feet; Mare aux Cochons district, 1500—2000 feet; 6 ♂.

16. *Psilopus indistinctus*, n. sp.

As stated above this species agrees with the previous description except for the following points: the front tarsus, while bearing the same pectination below the first joint, has the last joint absolutely simple and undifferentiated; the thin end of the front femur and the tibia are not quite so delicate and slender; the first tarsal joint is shorter in proportion. The size of the species is also about 4½ mm.

Loc. Seychelles. Mahé: cultivated country at about 1000 feet; Cascade Estate, about 1000 feet; high forest of Morne Blanc and Pilot; forest between Trois Frères and

Morne Seychellois, and the Mare aux Cochons district, both 1500—2000 feet, xii. 1908—i. 1909. There are 34 ♂. The localities given above under *P. pollicifer* and *P. indistinctus* refer only to the *males*. There is also a series of 39 *females* of the two species together, it being impracticable to separate them by ordinary methods in this sex. These females are from all the localities in Mahé in which the males were taken, including also two specimens from the slopes of Morne Seychellois itself, over 1500 feet, 4. ii. 1909 : and there are also 5 females from Silhouette (Mare aux Cochons plateau and the high forest above, 1000—2000 feet, ix. 1908). Both species were found always at high elevations and in all parts of the endemic forests up to the highest peaks.

The three following species form a natural subsection and are remarkable for the very aberrant swollen hypopygium ; except for differences in form of the latter the first two are closely related, and the description of the first will apply in most particulars to the second : the third is abundantly distinct.

17. *Psilopus magnicaudatus*, n. sp. (Pl. **27**, fig. 6.)

Head: all the specimens have the head somewhat shrivelled and the eyes pitted, but figs. 5*a* and *b* will apply very well except that the triangle just below the antennæ is much shorter, being scarcely 1½ times as high as the length of its base at the antennal level. The vertex is very brilliant shining blue-green; the damaged condition prevents certainty as to the bristles, but the front verticals appear to be absent, and the hind ones stand at the end of the post-vertical rows; the ocellars are like those of the preceding species. The orange palpi and tongue are also as shown in fig. 5. The antenna differs inasmuch as the third joint is perceptibly smaller and more pointed, and the second one is somewhat larger, being about 1½ times as long as the third ; in colour it is all blackish brown.

The thoracic dorsum, together with the scutellum, is very polished shining blue-green, the acrostichals are entirely absent and there are four dorsocentrals including the prescutellars ; the scutellum is rounded as in the previous species and carries a single side pair of long divergent and somewhat upstanding bristles. The pleura is orange. The wings are as in fig. 27 and are somewhat suffused : the squamal fringes are golden brown and the halteres orange.

The legs including all the coxæ are pale except for a faint darkening on the top of the hind femur and on the hind tibia. Front leg : coxa with a few scattered black bristles ; femur with a row of some five conspicuous sloping black bristles beneath on the basal two-thirds ; tibia simple ; tarsi clothed with dense short irregularly arranged bristly hairs, more conspicuous below ; lengths in mm., femur 1·1, tibia 1·0, first tarsal 0·8, rest 1·1. Middle leg : coxa with a few black hairs ; femur with a row similar to those on the front leg but stouter ; tibia with a long basal anterior bristle, a smaller middle one, three small bristles of the posterior row, and a small crown ; lengths in mm., femur 0·9, tibia 1·4, first tarsal 0·9, rest the same. Hind leg : coxa with a single outside bristle, femur with no special bristles; tibia with somewhat stronger bristle rows than usual, hind row just visible; tarsus simple; lengths in mm., femur 1·5, tibia 2·0, first tarsal 0·6, rest 1·2.

The abdomen is all suffused with dullish black with the incisures very narrowly pale ; it is covered with short black bristly hairs, and the marginal bristles are very slightly

longer than the others. The remarkable hypopygium is shown in fig. 6 ; it is very shining chitinous with yellow tips.

The female of this species is necessarily almost inseparable from that of the next one. If the antennal colour agrees with that of the males, namely with dark basal joints in *magnicaudatus* and orange in *grandicaudatus*, one can determine two female specimens as belonging to this species. They also agree with the males in having the hind legs perceptibly more reddish brown than do the other examples. If this separation be correct, they differ from the males in having the eyes narrowly separated by a parallel black face, and possess the usual large front femoral bristles ; exceptionally the other leg bristles are not larger than in the male. The colour of the insect, including the frons, is the same brilliant violet-green as in the male.

Size, excluding antenna, etc., $3\frac{3}{4}$ mm.

Loc. Seychelles. Silhouette: from the plateau of Mare aux Cochons and the forest above, 1000—2000 feet, ix. 1908, 2 ♂. Mahé: Cascade Estate, about 1000 feet, 1 ♂ and 1 ♀ ; marshy ground near sea-level at Cascade, 20. ii. 1909, 1 ♀.

18. *Psilopus grandicaudatus*, n. sp. (Pl. **28**, fig. 7 ; Pl. **30**, fig. 28.)

The above description of the last species will equally well apply to this, except for the following points: the antenna is much paler, being practically orange with a slightly darkened third joint. The pleura is rather blackened, but the wings (fig. 28) are a little less suffused. The front femur has not the regular bristles below, but has very irregular rows of variously sized bristly hairs. The middle femur is devoid of the row of bristles, and the femur itself is a little longer. The hind femur has a moderately conspicuous row of bristles along its anterior side. The hypopygium is quite different (fig. 7) and even more aberrant, being more pedicillate, quite pale chitinous, with the upper toothed sclerites darker. There is one male in which the appearance of the hypopygium is even more complex; it looks as if the (apparent) anterior part of the hood had opened showing further complexes slightly protruding. This male is not otherwise absolutely identical in every detail, but must at present be placed with the other specimens. The separation of the female from that of the previous species has already been considered. The females assigned to this species agree with the males in their violet-green colour including the frons, the head is like that of the last species, and the leg bristles are quite the same.

Size, excluding the antenna, etc., $3\frac{1}{2}$ mm.

Loc. Seychelles. Silhouette: Mare aux Cochons plateau and forest above, 1000—2000 feet, ix. 1908, 2 ♂, 1 ♀. Mahé: country above Port Glaud, 500—1000 feet, 1 ♀; near Morne Blanc, about 1000 feet, 1 ♀; Cascade Estate, 800—1500 feet, 1 ♂ 6 ♀; Mare aux Cochons district, 1500—2000 feet, i. 1909, 1 ♀. Praslin: Côtes d'Or Estate, ix. 1908, 1 ♀. This appears to be also an endemic forest form.

19. *Psilopus amplicaudatus*, n. sp. (Pl. **28**, fig. 8.)

This species attains the high water mark of hypopygial complexity and has in addition unusual leg bristles.

The whole insect is practically entirely yellow, except for its metallic blue-green frons, the area between the dorsocentrals, the hind part of the dorsum, and the scutellum, which are somewhat thinly but brilliantly shining greenish; this colour is absent outside those limits. Head very much like fig. 5, but shrunken in both the specimens; the sub-antennal triangle is a little smaller than shown, the labral one is very silvery; the palpi and tongue like those of the other species; apparently there is only the hind post-vertical bristle concurrent with the post-orbital row, and the ocellars; the hind head is not visible owing to the shrinkage. The antenna is slightly dusky orange and has the same form as that of the last two species, with a smaller and more coned third joint than that shown in fig. 5.

The thorax is quite devoid of acrostichals and bears four dorsocentral pairs including the prescutellars; the other bristles are as in the previous species. The wings have a venation like that of the preceding species. The squamal fringes when compared with the other thoracic bristles are golden brown, but appear nearly black against the pale body: the halter is the same in colour as the body.

Front leg: coxa with a few tiny bristles at base and three stout terminal black ones; femur with a somewhat spindled basal half, quite bare; first tarsal with the clothing bristles forming a tiny black inferior fringe on the basal half; rest of joints simple; lengths in mm., femur 1·25, tibia 1·4, first tarsal 1·25, rest 1·4. Middle leg: coxa bare; femur with about five very strong black diverging bristles on the basal half inferiorly; tibia with three of the superior row, a few tiny ones of the inferior, and two or three of the crown, all of them black; first tarsal with a similar small inferior row; rest simple; lengths in mm., femur 1·4, tibia 2·3, first tarsal 1·4, rest the same. Hind leg: coxa with one external bristle; the femur is remarkable in carrying an extremely strong row of six large black curved bristles on the anterior surface extending along the middle two-thirds of its length; there is a short row of inferior bristles below the first three bristles of the above row; tibia with three of the superior row and a single one of the superior-anterior row inserted just beyond the first of the other row; tarsi all simple; lengths in mm., femur 1·6, tibia 2·2, first tarsal 0·9, rest 1·8.

The abdomen is somewhat broadly browned along the axial line, the base is slightly swollen at the angles and carries on each side two thin bristles. The dorsum is covered with tiny dark bristles, but there are no true marginals. The enormous hypopygium is shown in side view in fig. 8. It is probably the most complex structure of its kind that has yet been observed. If the insect is oriented so as to look into the hood, perpendicular to the plane of fig. 8, each of the sclerites there shown bears accessory spikes and teeth which nearly meet in the median plane, forming an organ of very extreme complexity.

The female is very like those of the previous species in form; the thorax is shining on the absolute disc as in the male: the face is narrowly parallel and brilliantly silvery. The ordinary leg bristles in this species are much more developed than in the male.

Size, without antenna, etc., $3\frac{3}{4}$ mm.

Loc. Seychelles. Silhouette: highest forest, over 2000 feet (near Pot-à-eau), 12, viii. 1908, 1 ♀; Mare aux Cochons plateau and forest above, 1000—2000 feet, ix. 1908, 2 ♂, 2 ♀.

Craterophorus, gen. nov.

This genus includes the remarkable forms alluded to in the introduction as having the male characters on the base of the abdomen. The species offered considerable difficulty in deciding the sub-family to which they must be assigned. The balance of probability is that they must be placed in the Chrysosomatinæ. They have certain characters common to nearly all that sub-family, and others that are found in the same in certain cases. The Chrysosomatinæ are pre-eminent in the great variety of male characters that they exhibit, and three out of the four species now under consideration bear exceptional but correlated characters. On the first segment of the abdomen is a pair of spherical bulbs which are hollow, and from the base of each arises a rod like the pistil of a flower, which can be seen through a circular hole on the top of each. These bulbs are lengthened downwards so that they appear to be borne by the epiphragma running up the hind coxa, but on dissection they are seen to be really part of the first abdominal segment (fig. 16 *b*). In most Psilopids a more or less evident swelling exists on the sides of the base of the abdomen which very usually carries some conspicuous bristles. This formation is found in the females of the present genus. Further in *Psilopus alulifera*, Walker, from Singapore, the base of the abdomen is ridged and hairy, so that the above characters are not inconsistent with placing the genus in this sub-family.

In addition, however, to the above quite unique character, the males possess others. The squama is highly modified: instead of being a mere papilla bearing longish hairs as in the females, it is apparently mobile, having a long stalk and a chitinised head which bears a row of most remarkable stiff bristles, which are suddenly bent at right angles at the tips. The wings also bear an extra lobe at the base, absent in the females, and in the family in general, which lobe has a straight chitinised margin, bearing a perfectly regular row of exactly equal small stiff bristles, which are in close contiguity to those on the squama when the wing is stretched out in the position of flight. The two sets of bristles have a curious resemblance to some sort of musical apparatus. In this genus the male wing is also modified in outline (fig. 29), being strengthened by the formation of a triangular projection to the hind margin. This assemblage of characters is quite unique as a whole, and in respect to the first three characters is unique in each of its parts. It must be acknowledged that this prodigality in secondary male characters has had some influence on the author in deciding the position of the species.

The characters possessed in common with nearly all the Psilopids are: the non-touching eyes, the well-marked post-orbital row extending half-way down the head and there succeeded by dense bristly hairs behind the mouth forming a sort of beard, the form of the palpi with stout end bristles, the long legs, the well rounded and arched scutellum. Characters found in many Psilopids are the simple antennæ in both sexes with a dorsal arista, the somewhat irregular abdominal bristles with no large marginals, the absence of acrostichal bristles, and the strap-like paranal lobes. The range of variation in the head from forms with a deep head and level vertical ridge to those with wide heads and deeply excavate vertex is also found in *Psilopus* (sens. lat.). The venation is, however, entirely

aberrant, being somewhat like that of *Medeterus*, the third and fourth veins are curved and the fork of the fourth vein is absent. Similar differences occur in other genera of the sub-family; thus *Mesorhaga* has a vein bent up as in *Paracleius*. *Lichwardtia* has a fourth vein like that of *Dolichopus griseipennis*, while in *Anchineura* the two veins are straight and simple and there is no fork. Thus the aberrant venation is not felt to be an insuperable difficulty in the way of placing the species in the present sub-family.

The principal points in the diagnosis of the genus are as follows: Head: the faintly pubescent eyes are separate on the face; the vertex is either quite level or much excavate; the post-orbital row is long above and ends about half-way down, where it is succeeded by dense bristly hairs round the mouth, the palpi are somewhat bat-shaped with a few bristles and a long end one, the antennæ have small sub-equal joints, the second being somewhat globular, the third transverse oval; the long arista is dorsally inserted. Thorax: entirely devoid of acrostichal bristles; five dorsocentral pairs in straight lines with a small accessory sixth in front; scutellum arched and rounded in profile, with a single long pair of bristles; wings normally with a venation somewhat as in *Medeterus*; legs long and quite devoid of macrochætes. Abdomen: bristles rather irregularly distributed with no large marginal bristles; the males always with the associated characters described above on abdomen, etc.; in the females with three stout bristles each side on base; the hypopygium free, usually large, with strap-like paranal lobes. Type, the following species.

20. *Craterophorus mirus*, n. sp. (Plate **29**, fig. 16; Plate **30**, fig. 29.)

Male: the frons (fig. 16*a*) is triangular in outline, black, with coarse silvery pollen, and with the vertical ridge quite regular without any sign of hump. All the bristles are golden brown when viewed with side illumination; the divergent ocellars are inserted near the hind ocelli; the slightly convergent vertical bristles are inserted just remote from the eye-margins with their bases nearly collinear with those of the ocellars; the upper bristles of the post-ocular rows end in a pair which are much longer than the others and considerably more remote at their insertions, which bristles can be regarded as an outer post-vertical pair. The hind-head is entirely slightly shining slaty-black and the post-ocular bristles, which are pale in side light, get smaller as they go down the eyes; they extend about half-way down, where they are succeeded by abundant pale bristly hairs which extend all round the mouth margin. The eyes are just perceptibly pubescent, the hairs being very short indeed, and pale. In such specimens as have the head comparatively little shrunken, the eyes just touch in the middle of the face, and the front facets are distinctly larger than those on the hind part of the eyes. The epistoma is very small and slightly silvery; the tongue and palpi are yellow, the latter embracing the tongue and bearing a few scattered black bristles of which one at the tip is longer and more conspicuous. The antennæ (see fig. 17, the next species) are quite small and are entirely yellow except for the black arista. They are contiguous at the base; the first joint is very small; the second is slightly swollen above, where it bears an evident bristle; the third is of flattened oval form with a terminal dimple and pubescent tip; the arista arises dorsally just at the proximal corner of the dimple; the

basal joints are somewhat stout and carry a few tiny bristles; the flagellum is long and tapering and is shortly pubescent all round, the hairs getting sparser and longer towards the tip. In side view the abundant pale hairs extending from the neck to the tongue are very prominent.

Thorax: the dorsum is slightly brassy with greenish or reddish reflections depending on the direction of incidence of the light, and covered with a fair amount of pollen of a silvery appearance, which is more dense on the front of the thorax, and also forms a stripe between the dorsocentral bristles which extends as far as the fourth bristle, and narrows somewhat from front to back, where it suddenly stops. The dorsocentral rows are very slightly divergent both in front and behind, and the bristles are all collinear; there are five true dorsocentrals including the prescutellars, but an extra smaller pair is inserted just in front of the row and very close to the true first bristle; these bristles are all golden brown. There is no sign of acrostichal bristles. The rest of the chætotaxy calls for no remark except that the post-alar bristle is quite long. The pleura is entirely pollinated with grey. The scutellum is greenish brassy and is pollinated; it is somewhat arched in section and is rounded in profile; the single pair of terminal bristles is inserted somewhat nearer the tip than the base; the bristles are long and are very slightly curved inwards. The notopleura is large owing to the space required for the two bulbs, and is much the same in colour as the thorax. The remarkable squama (fig. 16 *b*) is yellow with its margin intensely black, and bearing six of the stout bristly hairs which are all suddenly twisted round at the tips. The yellow halteres have long oval heads and long stalks. The wings are shown in fig. 29 *b*, and have sharp angulations to the hind margin; they are clear with brown veins, of which the fourth is the stoutest and starts off from the third with a little callosity. The extra lobe has a darkened margin and it carries about twenty of the regular slightly curved bristles referred to above. The legs are entirely pale yellow including the coxæ; they are long, the hind femur and tibia being each nearly as long as the abdomen; the hind tarsus is about as long as the femur and has the second joint the longest. The front and middle coxæ bear a few pale bristles, and the hind one has a single one outside, but apart from these the legs are quite devoid of any bristles other than the very regular tiny clothing bristles; these are a little stouter on the tarsi, but there is no sign of the remarkable foot structure of the next two species.

Abdomen: the dorsum of the first segment is practically entirely covered by the two bulbs (fig. 16 *b*) which are blackish in colour; with an axial illumination, the dusky dorsum is seen to be very faintly greenish, and with side light it is duller and paler at the base: the venter is entirely yellow. All the bristles are pale and rather feeble without any regular arrangement of bordering bristles on most of the segments. The hypopygium (fig. 16 *c*) is brownish yellow and thinly chitinised so that it is imperfectly transparent in places, and carries a few scattered hairs. The eighth segment is apparently quite amalgamated with the hood and is not very clearly defined. The terminal paranal lobes are strap-like and covered with hairs which are pale except towards the tip, where they are black. On close examination it is seen that the lobes are quite united for a little distance from the base, but then become two separate strips, which are so closely applied face to face that it is only in one or two specimens that they can be seen to be distinct.

Female: closely resembling the male except for the secondary sexual differences. The head is very much the same, the eyes nearly touching in much the same way. The colour is exactly the same, but the abdomen is slightly less pale and duller. The basal segment is slightly ridged, and carries two or three large bristles in the place where the knobs are in the male. The wings are perfectly normal as shown in fig. 29 *a*.

Size, excluding hypopygium, a little over $1\frac{3}{4}$ mm.

Loc. Seychelles. Mahé: Cascade Estate, 800—1500 feet, 8 ♂, 22 ♀; cultivated country at about 1000 feet, 1 ♀; near Morne Blanc, about 1000 feet, 1 ♀. Despite the occurrence of 1 specimen in cultivated ground, this is almost certainly a forest insect, the bulk of the examples being from Cascade, and having been taken doubtless in the luxuriant forests that rise behind that estate.

21. *Craterophorus mirabilis*, n. sp. (Plate **29**, fig. 17.)

The second species is represented by a single male and two females; it stands almost midway between the other two. The wing venation is practically identical in both sexes with that of the previous species, with which it agrees in general appearance; but it has the remarkable feet and hypopygium of the following species. Head: the eyes are widely separate and the front view is quite adequately given by fig. 9 *a*, belonging to the next species. The whole head and face from vertex to mouth edge is dark grey with minute dull silvery pollen, but with side light the underlying colour is seen to be blue-black. The silvery pollen forms two dense patches, one on each side of the clypeus. The eyes are brick-red and pubescent, especially below; the facets of the lower part are distinctly larger than those of the rest of the eye. The palpi are orange, somewhat bat-shaped, and rather hairy with a stout terminal spine; the white beard is very prominent. The head bristles are all brown in side view; the ocellars are straight and divergent and are seated midway between the ocelli; the comparatively large convergent verticals are inserted nearly in line with the ocellars; the post-orbital row increases in length regularly from half-way up the eye to the top, where the bristles are very long, the last and more remote bristles being especially long and simulating a second pair of verticals. The antennæ (fig. 17) are very dusky orange, almost black, with a form very like that of the first species, the somewhat swollen second joint bears longer bristles above and below, and the small transverse-oval third joint is dimpled at the tip, where it is very hairy. The arista is inserted close to the edge of this dimple, with normal basal joints and a uniformly tapering and finely pubescent flagellum. In side view the eye hides the rest of the head, and the white bristly beard extends from the level of the neck to the oral margin. The hind head is like the frons.

Thorax: the dorsum is metallic green in front and bluish behind with green reflections. It is all slightly pollinated especially in front, while two somewhat evanescent stripes, parallel to the dorsocentral rows, show up from a deficiency of the pollen. There are five dorsocentral pairs diverging to the last or prescutellars which are quite long; in front of each row is an accessory smaller bristle; the acrostichals are quite absent. The scutellum is rounded in profile and section and is coloured like the hind part of the thorax; it bears two approximating end bristles inserted about half-way between the tip and the hind angles. The pleura is somewhat blackened with greenish reflections on the mesopleura, and

excessively faint silvery reflections. The wings have the same shape and venation as the first species but are just a little longer in proportion to their depth; they are very slightly darkened and have brown veins. The thoracic squama and the pectinate lobe on the wing are practically the same as in that species. The halteres are dark orange with long oval heads. The legs are entirely yellow except for the greyish slightly silvery coxæ. The front and mid coxæ have a few pale bristles, and the last one has the usual bristle outside. There are practically no true macrochætes; the clothing bristles are very regular and are upright and especially strong on the front tarsus, which has the remarkable form found in the next species (fig. 9 *b*), the only difference being that the feet are a little smaller, and that there are apparently only three of the very large bristles on the back of the flattened last joint. The first joint of the hind tarsus is about two-thirds the length of the next.

Abdomen: the general structure is almost exactly as in the previous species, but the colour of the whole (including the bulbs) is fairly shining metallic green with a blackish tone; the bulbs do not quite meet in the centre line. The hypopygium is similar in structure to that of the next species, and quite different from the previous one; it is provided with strap-like appendages as shown in fig. 9 *c* but they are relatively smaller, and the whole structure is not relatively so long: it is unfortunately impossible to give a figure.

Female: as regards the general colour the female is very like the male but is a little more dusty. In the single good specimen the eyes are also prominent, though less so than in the male, but the other specimens have the head deformed. The face and frons are coloured as in the male but the face is somewhat more silvery. The wings are as shown in fig. 29 *b* for the first species. In the place where the male bulbs are found, the abdomen is just perceptibly swollen and at that place are two or three exceptionally stout bristles.

Size, a little over 2 mm.

Loc. Seychelles. Mahé: from scrubby endemic forest-vegetation on the summit of Mount Sebert, 1800—2000 feet, i. 1909, 1 ♂, 3 ♀. This was one of the most distinctive localities in the endemic forest: stunted endemic forest-growth rising from fissures in a "glacis" of bare granite, and certain species of plants known in a wild state only from single, or from very few, specimens, occurring in the vicinity.

22. *Craterophorus permirus*, n. sp. (Plate **28**, fig. 9; Plate **30**, fig. 30.)

This species is the most aberrant of all and is unfortunately only represented by two males. Head: the frons is all shining green covered with fine adpressed silvery pubescence, which forms a pollination strongest alongside the eyes, although the excessively narrow true eye margins are black. In front view, fig. 9 *a*, the vertex is deeply concave with a prominent hump; the swollen eyes are minutely pubescent, the hairs being longer below. The face is shining green like the frons, but is very faintly roughened: the face and frons run into one another, being indistinctly separated by a bulge across the face just below the antennæ. The silvery dust is stronger on the clypeus which has a very dense silver patch each side close to the eyes. The palpi are yellow with a few small dark bristles, and a very stout terminal one; the proboscis is also yellow. The ocellar bristles (broken in both specimens) are inserted just in front of the hind ocelli and are stout and divergent; the verticals are inserted close to the eye in the upper angle of the face, and, though quite

short, are stout; they point forward. The post-ocular row is very prominent and its last bristle on the top is much longer than the rest, more remote at the base, and forms a large outer vertical; all the bristles are blackish. The white beard is very striking in this view. In side view the eyes completely hide the rest of the head. The antennæ are all black or nearly so; the shape is as shown and is very much the same as in the second species, with a densely pubescent arista. The post-ocular bristles attenuate to the middle of the head where they are succeeded by the dense white bristly hairs that cover the lower part of the head.

Thorax: the dorsum is bright shining æneous green with bluish and violet reflections; there are five large dorsocentral bristles on lines somewhat diverging to the last or prescutellar pair; they are brown in side view, the acrostichals are quite absent. The scutellum is rounded in section and profile and is coloured as the thorax; the long and slightly convergent end bristles are inserted midway between the centre and the hind angles. The pleura is black with minute silvery pubescence, the mesopleura being somewhat greenish. The notopleura is large and coloured like the thorax but a little duller, and has a pronounced rib at its base below the scutellum. The wings are shown in fig. 30. They are clear with brown veins: the curved second and third veins are very aberrant, these being the stoutest; the thoracic squama is close to the wing base and is all black, as is the rest of the base of the wing; it bears a fringe exactly similar to that in the first species, consisting of about eight stout bristles which are sharply bent at the tip. The extra lobe of the wing is all black and bears a pectination just like that of the first species; in the present species the close approximation of the two sets of bristles is very apparent. The veins at the wing base are exceptionally stout. The halteres are very dark orange with long oval heads and fairly long stalk. The legs are long, entirely yellow except for a slight greyish silver on the base of the coxæ, a darkened posterior side to the spindled front femora, and slightly infuscate feet. The front and mid coxæ have a few bristles, and the hind one the usual outside one. The clothing bristles are very regular, but the only sign of macrochætes is a faint row of four tiny true bristles on the hind tibia. The front feet (fig. 9 *b*) have the remarkable form found in the second species; the pads are pectinate at the ends with dense long silvery hairs: all the spines are black. The middle feet are quite normal, but the hind pair have the last joint very slightly flattened like the feet of the first species.

Abdomen: the dorsum is blackish green with brighter green and blue reflections, these being more evident at the base and tip. The two pitted bulbs are smaller in proportion than in the other species, being inserted quite on the edge of the segment and leaving a considerable part of it visible; the hole is larger than in the other species. The clothing bristles are rather irregular and do not form very definite marginal rows. The hypopygium (fig. 9 *c*) is dark shining orange, and with its appendages is of great length, extending back practically to the base of the abdomen. The paranal straps are yellow with profuse long yellow hairs; they are well separated distally.

Size, without the hypopygium, $2\frac{3}{4}$ mm.

Loc. Seychelles. Mahé: Cascade Estate, 800—1500 feet, i.—iii. 1909, 2 ♂.

Neurogoninæ.

23. *Neurogona angulata*, de Meijere, Tijd. v. Ent., lix. 1916, p. 228. (Pl. **30**, fig. 31.)

There are 12 females which agree very well with de Meijere's description and figures. Dr de Meijere considers that they are referable to his species but differ in some small respects. His specimens have a conspicuous dull grey spot on the hind part of the thoracic dorsum which is absent in the Seychelles specimens. These females have slightly more dusted pleuræ, and the front coxal bristles are less numerous and more yellow. The unusual form of the female antenna is remarkable; it differs widely from that of the ordinary species, having a third joint of the form found in Dolichopodinæ.

Loc. Seychelles. Mahé: Cascade Estate, 800—1500 feet, 1908—9. Described from Java (Semarang).

Dolichopodinæ.

Paracleius, Loew.

With the exception of *P. prædicans* (Walker) from Celebes and *P. maculatus* (de Meijere) from Java, this genus appears to be confined to Central and South America, so that it is of interest to find that another species occurs in the Seychelles. It is represented by 3 males and 11 females. The genus has been discussed by Aldrich in the *Biol. Centr.-Americana* and the present species agrees with his criteria as well as with Loew's definition of the genus (*Mon. Dipt. N. Amer.*, 3, II. 97, 1864). The species must be closely related to the above mentioned *P. maculatus*, described by Dr de Meijere in *Tidj. v. Ent.*, lix. 232. A specimen has been examined by him, and he states that it is identical in colour with his species, but that *P. maculatus* differs from the Seychelles species in that the lamellæ are somewhat different in shape and are black; the middle femora have the hairs beneath a little longer; the third antennal joint is yellow only on the base beneath. It is thought well to give a detailed description of the species since it is but the second of the genus so far found in the Old World.

24. *Paracleius solivagus*, n. sp. (Pl. **28**, fig. 10; Pl. **30**, fig. 32.)

Male: head, viewed from the top; the frons is seen to be depressed below the level of the narrow eye-margins; it is brilliant opalescent green. The ocellar hump is small, bituberculate, bronzy green in colour, with the ocellar bristles inserted on the tubercles directly in front of the hind ocellus; these bristles are divergent and bent backwards, the vertical bristles are inserted close to the eyes collinearly with the ocellars, and are directed forward and inward and cross at the tips. The post-verticals are much thinner than the others and are inserted well down the back of the head, their bases being slightly nearer than those of the vertical bristles; they converge to the centre. The back of the head is black, much suffused with silver dust; the four upper bristles of the post-ocular fringe are black, the top one being the longest; the lower bristles are white. The breadth of the head across the eyes is about $2\frac{1}{2}$ times the maximum axial length. In front view the face is excessively silvery from below the base of the antennæ; it is narrow (fig. 10*a*), and the eye boundary is quite uniform in curvature with no sudden change at the level of the antenna. The clypeus is small and does not reach the level of the bottom of the eye by about its own breadth. The overall depth and breadth of the head are about equal. The

eyes are densely clothed with silvery white pubescence which gets longer from top to bottom; the facets are all of nearly equal size. The palpi are small and dark orange in colour, and the tongue is black. In side view (fig. 10*b*) the face nowhere projects beyond the eyes except just at the mouth margin, and the eye profile is an almost perfect arc of a circle, while the back margin is slightly undulating. The lower white post-orbitals extend over the oral opening. The antennæ are entirely pale orange with a blackish arista; the first joint is simple and haired above; the second is of the usual calyx-like shape with a border of tiny bristles, a longer one above and two similar ones below; the third joint is smooth; the arista is fairly stout and rather short in proportion; it is curved at the flagellar junction and the flagellum is minutely pubescent towards the tip.

Thorax: the dorsum is very brilliant, and the general colour is best appreciated with an illumination falling in the direction from scutellum to head. It is then seen to be of a brilliant blue-green with a bright copper-green line between the acrostichal rows; the whole dorsum has similar coppery reflections especially round the dorsocentral and other bristles. The acrostichal rows extend from the level of the front dorsocentral pair to a little before the scutellum. The whole of the dorsum beyond a transverse line passing through the front dorsocentral pair and the humeral bristles appears (in this illumination) to be of a deep velvety black: behind this, but on the blue-green basic colour, is a silvery belt which is interrupted by the dorsocentral rows; this is succeeded by a similarly interrupted belt of velvety black, which consequently forms two large broad spots extending from the third dorsocentral bristles to the base of the wings. Just before the scutellum is another black velvety band, the front margin of which is V-shaped, the hind margin extending to the scutellum. Where these superposed bands do not occur, the basic colour (as stated above) is bright blue-green. The outline of the thorax converges slightly from the wing bases, its sides merging into those of the scutellum. The latter is trapezoidal in form, bright green in colour, more brassy on the margin, and with the sides velvety black. Including the prescutellars there are six dorsocentral pairs, which form uniformly diverging lines; there are also about six pairs of stout acrostichal bristles, which are also slightly divergent and extend to the level of the fifth dorsocentral pair. The humeral bristle is upright as usual, with a large post-humeral bristle inserted close behind it; there are three supra-alars, one just in the top of the cross furrow, with the others on the inner boundary of the black side spots; there is also a large post-alar bristle and two notopleurals. The scutellum has a large bristle on each of the extreme angles, which bristles converge slightly towards the tips; just at the base of each is a smaller bristle, and a still smaller convergent pair lies on the tip. The pleura and epimeron are dull black with very faint dull green reflections; there is a fairly long prothoracic bristle and the usual row of bristles over the neck. The prothoracic spiracle is dull orange with a front row of protecting bristles. Wings shown in fig. 32; they are rather smoky, especially towards the costal margin, but the space between the third and fourth veins is somewhat glassy; there is a distinct notch where the fifth vein approaches, without attaining, the margin; the veins are dark brown. The squama consists of a small orange scale with about eight long black curved fringing hairs. The halteres are yellow.

The legs are yellow except that the mid and hind coxæ are darkened, the mid tarsi are infuscate, and the hind ones black. The legs are covered with fine black clothing-bristles

which are arranged in regular rows except on the femora; these bristles are longest on the hind legs. The chætotaxy is as follows: front leg: coxa with about four bristles in a row on the anterior margin; femur with two or three weak posterior bristles at the end; tibia with antero-superior and postero-superior rows of three each, inserted in pairs on the middle third, the anterior row being the stoutest, also a crown of very small bristles; tarsus with no bristles, simple, the first joint about equal to the remainder. Middle leg: coxa stoutly bristled in front; femur with anterior bristle at base, a large pre-apical and a long inferior row of six bristles extending from the base for about two-thirds of the length: tibia with an antero-superior row of three bristles, a postero-superior row of four, the first, second and fourth of the latter row forming pairs with the former row, the upper pairs being much the smaller, a single inferior bristle in the middle and a crown of five bristles the inferior of which is the longest: tarsus with the usual small terminal bristles, the first joint not quite so long as the next two. Hind leg: coxa with a bristle outside; the femur is flattened sideways and the clothing-bristles on the edges are very long and simulate bristle rows; there is a stout antero-superior pre-apical bristle and a tiny brown spot outside at the tip. The tibia has antero-superior and postero-superior rows of four bristles, which stand nearly opposite one another, the proximal ones being the smallest; just beyond towards the tip is a single bristle inserted between these rows; the crown consists of about three bristles. The tarsus has a first joint of a length about half that of the second and equal to the third, and the joints have the usual basal bristles.

Abdomen: in dorsal view this tapers with somewhat concave boundaries from the very broad epimeron to the tip, the epimeron being about $2\frac{1}{3}$ times as broad as the last body segment. The abdomen is covered with long bristles, longer on the margins, and longest on the last segment: on the sides of the first segment, close to the epimeral boundary, is a short row of stout bristles. The colour is metallic green with golden reflections, but there is a continuous black median line on the last four segments, together with cross black lines that include the segmental borders: the basal segment is much darkened dorsally. On the sides the black cross bands are much widened, and between them the sides are very silvery. The hypopygium (fig. 10 *c*) has its right-hand side smooth and rather dull, black except at the tip: the left-hand side has a large eighth segment which almost covers the base, black, a little silvery, and covered with long hairs especially on its distal portion; the ninth segment is more broadly orange than on the opposite side. The penis is very stout, long, and orange with a black tip. On the (true) lower angle of the ninth segment is an elongate process on each side which is orange and haired at the tip. The paranal lobes are regularly oval and shell-shaped, they are yellow with a few small black bordering bristles. The inner lobes are more closely approximate than usual, and thus almost completely hide the inside appendages, which are entirely pale and appear to be stout cylinders in form.

Female: this sex closely resembles the male in all essential characters; the breadth of the face is about one-sixth of the maximum eye-breadth.

Length, without hypopygium and antenna, 5 mm.

Loc. Seychelles. Silhouette: plateau of Mare aux Chochons, about 1000 feet, ix. 1908, 1 ♂. Mahé: Cascade Estate, 800—1500 feet, 1908—9, 2 ♂, 11 ♀.

Tachytrechus, Walker.

A single species of this genus was found which cannot be referred to any of the described species from Africa or Asia. It has immaculate wings and the front legs are of the simplest *Dolichopus* form. It would appear to be a rather primitive and undifferentiated form of the genus. The general chætotaxy is on the whole normal and will not be given in detail except for the legs. The species, which is evidently one of the African type, is unknown to Dr de Meijere.

25. *Tachytrechus seychellensis*, n. sp. (Pl. **28**, fig. 11; Pl. **30**, fig. 33.)

Male: in top view the head closely resembles that of the European species *T. notatus*, except that the bristles are far less strong. The frons is slightly greyish green and is covered with golden pollen, especially on the broad eye-margins. The eyes are clothed with excessively close, short, silky pubescence. In top view the usual internal tooth on the long first antennal joint is visible. In front view (fig. 11 *a*) the face is narrowest just below the antennæ, and widens uniformly to the end of the epistoma, contracting again below; the boundary between the epistoma and the clypeus is curved, as is the margin of the latter, which does not reach the bottom of the eye by an amount a little short of its own breadth. The face is all covered with bright grey-gold pollen, and from the oblique aspect in which the frons is now seen, this pollen appears also to cover the broad frontal eye-margins. The palpi are small and black, the tongue is also black. In side view no part of the head or face is visible. The antenna (fig. 11 *b*) has an orange first joint, which is nearly as long as the second and third joints together, hairy above; the second joint is small, orange in colour, fringed marginally with bristles; the third joint is a small oval and is all black; the arista is also black, and is bent at the point of junction between the almost bare flagellum and the thickened basal joints. The hind head is brassy above merging into a bluer part below; it is suffused with silvery grey pollen. The upper post-orbital bristles are black and the lower quite white, not yellowish as in *T. notatus*, and the diffuse bristles above the hind part of the oral opening are also pure white.

The thoracic dorsum is olive green, rather brassy, and often with violet reflections: it is covered with diffuse golden pollen. The acrostichal bristles are rather unusual in form, as are the dorsocentrals; instead of being short and stumpy the latter are fairly long and slender; the acrostichal bristles are of the same character, and are also far less in number than in normal forms of the genus, being scarcely twice as many as the dorsocentrals; furthermore they do not run over the front of the thorax. While the general chætotaxy is normal, it is rather under-developed. The scutellum is of the usual trapezoidal shape, and is of the same colour as the thorax but it is generally slightly more brassy at the tip; the usual approximating end bristles are accompanied by a small accessory bristle just behind each. The pleura is densely covered with the finest dark silver-grey dust, but faint traces of metallic reflections can be seen; the dust extends over all the coxæ and the epimeron. The prothoracic stigma is bordered with bright orange pubescence, so that it forms a conspicuous spot on the side, a very usual character in the African species; the usual black velvety spot lies above the wing base. The wings (fig. 33) are normal in venation, with the usual costal thickening near the base: there is no sign of any spots or

any darkening of the cross veins; the veins are black, and the wings are quite glassy but orange at the base. The squama is tuberculate with pale pubescence, and about a dozen long black fringing bristles. The halter is all dull orange.

The legs are orange except for (1) the darkly dusted coxæ, (2) the greater part of the fore and mid tarsi, (3) the whole of the hind tarsi and tip of the hind tibia, which are blackened. Front leg: coxa bristled in front; the femur, which tapers uniformly from base to tip, is devoid of clothing-bristles below, and has no long bristles, possessing only one or two very small bristles below at the tip; the tibia has three superior, two postero-superior, and two longer inferior bristles which are opposite the lower two superior ones; it has also a small crown: the tarsi are quite simple with pulvilli and pads similar to those of the other feet, the joints being rather stout but in no way modified; the first joint is about equal in length to the next two, and all bear the usual small basal bristles and pads of small silvery hairs on the plantar surfaces. Middle leg: the coxa bristled, the bristles on the side being the longest; femur as in front legs but not spindled in shape; tibia very slightly dusky at the tip and very bristly; superiorly there are two especially long bristles, about the terminations of the first and second thirds of the length, forming two pairs with the similar antero-superior bristles; below each of these rows are about three smaller bristles; inferiorly there are two rows of from seven to eight bristles which increase in length from base to tip, where they merge into the crown of five large bristles, the lower pair of which is the longest: the tarsi are like those of the front feet, except that the first joint has a long inferior bristle near the base, and the small basal pairs are stouter. Hind leg: the coxa has the usual outside bristle; the femur has clothing-bristle rows all over, three superior bristles on the last third, a true anterior pre-apical: the tibia has two superior rows, the anterior consisting of five bristles, the posterior of six, the first four of these rows form pairs, but the fifth of the anterior row lies between the last two of the posterior row; inferiorly there is a row of seven bristles lengthening from quite small ones at the base to the normal size near the tip: there is also a crown of three stout bristles outside and below, and a superior bristle rather remote from the tip; the tarsi are simple, the first and second joints being about equal, and each a little shorter than the other three joints taken together; the inferior basal bristles are stout.

Abdomen: laterally compressed, bright green, the distal half of each segment being more coppery than the proximal; it is covered with bristles, the marginal ones being the longer, and those on the last body segment being very long. In side view the lower half of each segment is largely silvery, as is the cap formed by the eighth segment on the side. The hypopygium (fig. 11 *c*) is black and somewhat suffused with silvery dust, its end is extremely shiny, and striated at the tip near the insertion of the inner laminæ, which are small, black and pointed, with a median paired appendage between them; more ventrally there is a small papilla with hairs on it. The paranal lobes are black and nearly circular except for the short stalks, and are fringed with long black hairs which are longest at the posterior outer corner: the (true) ventral surface is somewhat rufous. The female closely resembles the male, the face being only a little broader in the female.

Length, $5\frac{1}{2}$ mm.

Loc. Seychelles. All the specimens from cultivated places at sea-level. Mahé: coast-marsh at Port Glaud, 5. xi. 1908, 8 ♂, 2 ♀. Long Island, vii. 1908, 1 ♂, 1 ♀.

ARGYROCHLAMYS, gen. nov.

This genus is founded for a very interesting species from the sandy sea shore of Long Island, Mahé, 3 males and 1 female. Like so many sand haunting species it has a greyish general appearance. It resembles a rather overgrown stout Psilopid of the *contristans* type, but it is almost undoubtedly a true Dolichopine; in this opinion Dr de Meijere concurs. The most striking points are the widely separated eyes in both sexes, the exposed genital appendages in both male and female, and the exceptional venation. The points that may be emphasized as delimiting the genus are as follows: the eyes are widely separate in both sexes; the venation is aberrant as shown in fig. 34; the second vein is unusually short, the third vein is widely arched so as to bring it close to the second for the greater part of its length, but curving forward after the costal junction of the second vein to run into the costa a little before the tip; the fourth vein recalls the form in *Psilopus*, but the lower fork of the latter is absent; the legs are quite simple and the hind ones have no upper bristles on the first tarsal joint; the hypopygium is non-pedunculate and much like the regular Dolichopid form, but the hood is small, so that the unsymmetrical internal appendages are visible; the paranal lobes are strap-like; the female has its chitinous genital complex entirely exposed. Another character lies in the exceptional development of the epimeron and the fringing hairs to the squama, which together form a sort of cage containing the halter.

26. *Argyrochlamys impudicus*, n. sp. (Pl. **28**, fig. 12; Pl. **30**, fig. 34.)

Head, top view: the whole vertex, frons, etc. are densely pollinated with silvery grey; the ocellar hump is well marked off from the vertex by side furrows, but in front is continuous with the frons. The ocelli are rather large, and bright chestnut brown. The head bristles are all black; the ocellars are inserted on tiny dark circular spots between the ocelli; they are straight, divergent, and seated a little outside the centre line from the side to the front ocellus: a very small pair of fine convergent bristles stands a little behind the hind ocellus. The vertical bristles are almost straight and converge a little; they are inserted almost in line with the ocellars and stand on tiny blackish spots just remote from the eyes. Unlike the other main bristles, the post-verticals are white as is the post-orbital fringe; they are inserted rather far down the back of the head, and somewhat closer together at the base than are the verticals. The wholly white post-orbital row has the first four or five bristles gradually diminishing in size, the upper bristle being nearly as stout as the post-verticals. The eyes are densely covered with short silky hair, which is perceptibly longest in front.

Front view (fig. 12 *a*): the frons and face get narrower from the vertex to the clypeus, being about one-third the total face breadth at the antennal level and about two-thirds narrower at the clypeus. The side boundary is nearly straight, though there is a perceptible sinuosity at the level of the antennæ. The whole face, like the frons, is densely covered with silvery pollen. The clypeus is very short with a rounded slightly swollen tip, and is demarcated from the epistome by two very small side slits. The palpi are very small, orange, with black hairs, and the tongue is also orange and hairy. The antennal bases are

seated in well-marked contiguous pits; the antennæ (fig. 12*b*) are almost entirely orange, except that the distal half of the third joint is slightly dusky. The first joint is obconical with a distinct internal tooth, it is somewhat silvery with a few scattered hairs on the upper surface; the second joint is of the normal calyx-like shape, fringed with black hairs which are short at the side, longer at the top, and with the three lower hairs more stout and bristle-like; the third joint is of the normal Dolichopid form, ovate, with a slightly rounded tip; the dark dorsal arista is inserted just at the junction line of the two colours of the third joint, its basal joints long, stout and rather curved; the flagellum is entirely bare throughout, and tapers uniformly to a fine point; its total length is about $1\frac{1}{2}$ times that of the whole antenna. The back of the head is all covered with silver grey pollen: the post-orbital row is very regular nearly to the sides of the mouth, but is there succeeded by numerous long white bristly hairs behind the same.

The thoracic dorsum is entirely covered with very bright silver pollen and has a slight, but evident, concavity before the scutellum. The latter has a rounded boundary between it and the thorax, and its edge is an almost exactly parallel curve, so that the shape is that of a parallelogram with the long sides formed of curved arcs; the pollen on it becomes slightly reddish on the margin. The thoracic chætotaxy is very similar to that of *Dolichopus*, the bristles are all black and less stout. In *Dolichopus*, if all the bristles from the prescutellar pair to the front of the thorax are regarded as being dorsocentral, it will be seen that the pair just ahead of the prescutellar pair is very often more closely inserted than the others: in this species this point is much accentuated. Starting from front to back we first have four pairs gradually increasing in length, then comes the larger fifth pair inserted much closer together, only a little outside the range of the acrostichal rows; finally there is the sixth pair on the normal diverging lines of the fourth, and this pair is the stoutest of all. The acrostichal rows start with tiny bristles on the front which get longer till they end beyond the fourth dorsocentral pair; the true acrostichal bristles number about six. The other thoracic bristles are normal. The scutellar bristles are stout and cross at the ends, and are inserted about midway between the side margins and the centre; just outside each is a tiny accessory bristle. There are about three or four white bristles on each side of the neck. In front of the prothoracic stigma is a bunch of long fine silky hairs; there are the usual small prescutal bristles (in Oldenberg's sense), but much sparser than usual. The whole pleura is smooth and silvery like the dorsum. The wings are as shown in fig. 34; they are slightly milky, the veins all orange, but the costa is closely margined with a double row of very tiny black bristles. The sudden bend of the fourth vein is accompanied by a knot at the point of bending. The squama is large and scale-like, and has a beautifully ribbed margin and a fringe of many long curved pure white hairs; the epimeron is exceptionally large and membranous, and the yellow halteres lie on it: they have curiously flattened knobs, and the long squamal hairs bend over to the boundary of the epimeron and form a perfect protecting cage for the halter.

The legs are entirely yellow except for (1) the base of the mid and hind coxæ which are slightly brownish, (2) the last two joints of the mid tarsi which are slightly dusky, (3) the distal fifth of the hind tibia and all the hind tarsal joints (except the extreme base of the first joint) which are dark brown. The bristles are mostly very fine, sometimes quite

inconspicuous, especially so in the male. Front leg: coxa with stout bristles at base and tip and many small ones: femur with only longish clothing-bristles, longest behind, and bare below: tibia with about three antero-superior, two of the postero-superior row and the last of an inferior row, all very small; a crown of about five tiny bristles: tarsus with simple joints which are just perceptibly swollen distally, the first joint about as long as the next two together, these being about equal. Middle leg: coxa bristly; femur with bristle rows in front, bare behind, the lowest row forming a fine inferior ciliation, a fair sized pre-apical bristle in front: tibia with three small antero-superior bristles, the lower just below the middle; three small postero-superior bristles, the top two nearly opposite those in the former row, the last much further down than the other of that row; two inferior, the lowest being opposite the last bristle of the latter row; a crown of five of which the inferior one is long and stout; tarsus with first joint about $1\frac{1}{2}$ times the second, the other joints getting regularly smaller and smaller towards the end; each joint has a tiny terminal crown instead of the usual basal pair. Hind leg: coxa with outside bristle; femur with stout clothing-bristles in front, but bare behind; these bristles form a fairly conspicuous ciliation superiorly and inferiorly on the basal half, and antero-inferiorly all along the femur; there is also a stout superior pre-apical: tibia with four antero-superior and four postero-superior bristles all on the pale part, a fifth postero-superior bristle is on the dark part just short of the true crown; anteriorly there is a crown of two bristles: tarsus with the first joint about three-fourths the length of the second and a little shorter than the third, all the joints with tiny terminal crowns. The end of the tibia and that of the first tarsal joint carry pale combs.

Abdomen: dorsal aspect, conical in outline with very slightly convex sides, the clothing-bristles stout and regular, more upright on the sides of the first and second segments, and with the marginal rows especially long, except on the first segment. The general colour is somewhat submetallic blackish green with silvery reflections, but each segment is margined with a white edge carrying very conspicuous tiny dots on which stand the marginal bristles: the boundary between the white margin and the dark part is not sharp, and between the two the white band is brownish yellow. The hypopygium is non-pedunculate (fig. 12*c*), the seventh segment on the right-hand side being scarcely visible; the hooded ninth segment is compact, stout and very chitinous, the ventral part being shining black, the dorsal somewhat dusted with pale pollen. The large scale-like eighth segment largely hides the ninth on the left side; it is blackish with silvery pollen, and carries a few long scattered hairs. The small pale tenth segment carries the long strap-like paranal appendages which are about as long as the ninth segment; these are yellow, and are covered externally with bristly hairs, but the marginal hairs are paler, and the long end ones are curved at the tip. The internal clasping pieces are here quite exposed and visible, appearing as if the floor of the hood had been swollen up so as to bring them into view. The appendages are as follows: the most proximal are a pair of hooks, of which the right one is nearer the base than the other, these are shining black; more distally is a single horny orange spike with a basal papilla; still more distally is a pair of brown rods arising from the tip of the swollen base, and with the ends showing well beyond the horny edges of the hood; each has at its base a few hairs. Finally we have the bent penis,

whose tip protrudes between the last mentioned rods. It will be seen that the female has a similar condition as regards the externality of these sclerites, and the two conditions appear to be correlated.

The female is much like the male, the face being a little broader, and in the single specimen present the abdomen is much more extensively orange, the greater part of the first segment, the whole of the second, and the marginal stripe of the third segment being of that colour; the last segment is entirely dark. The extruded genitalia (fig. 12*d*) are nearly as remarkable as in the male; there is a stout dorsal median process furnished with three strong black teeth on each side at the top; below the base of this is a large central papilla and short rods, all bearing fine hairs; then on each side is a curiously twisted and flattened chitinous rod which appears to arise from well inside the abdomen.

Length, excluding hypopygium, $4\frac{3}{4}$ mm.

Loc. Seychelles. Long Island (a coconut-planted islet near Mahé), vii. 1908, 3 ♂, 1 ♀; taken on the beach.

Urodolichus, gen. nov.

There are three species which belong to the Dolichopodinæ owing to the possession of such characters as the double acrostichal row, the complete post-ocular fringe, the single coxal bristle on the hind legs, etc., characters which fairly fall within the definition of the European genus *Hypophyllus*. The superficial appearance of both male and female is strongly reminiscent of the corresponding sexes of *Porphyrops* as they have the same brilliant purplish tone of colour, and the male paranal flaps are strap-like and hairy. Apart from the above characters the genus is well separated by the following points: The eyes are hairy and in the male are entirely holoptic below the antenna, which has a small rounded third joint with a very long dorsal arista. The venation is fairly distinct as shown in figs. 35 and 36, the third and fourth veins being somewhat curved, and though on the whole parallel, yet they converge somewhat at the tips. The genitalia can best be understood from the diagrammatic representation in fig. 13*e*, which gives a rough outline of the true dorsal view of the type species. The hypopygium is very pedicillate, the seventh segment (VII) being long and fairly slender, in one species excessively so. The eighth segment (VIII) is as usual twisted to the right, and is very hairy, though all hairs are omitted from the diagram. The hood of the ninth segment (IX) appears to be continued by two hinged flaps (*H*), which in the first species bear two smaller internal flaps which are apparently closely adherent to the main ones; in the second species these are not separate, and only appear as indistinct ridges, while in the third species there is no sign of the small accessory flaps being separate, except as lobes on the tip, and the main ones are much smaller. The paranal lobes (*A*) are long and strap-like and very much haired. In the first species they are very long and curved, in the second they are fairly long but straight, while in the third they are much shorter and are somewhat bat-shaped at the ends. The general chætotaxy offers no special features. Type, the following species.

27. *Urodolichus porphyropoides*, n. sp. (Plate **28**, fig. 13; Plate **30**, fig. 35.)

Head, top view: the breadth is greater than that of the thorax, the profile of the eye is flattened, so that the total eye-breadth is more than three times the axial depth. The

eyes are densely covered with very short pale pubescence. The frons is all bright steel blue with a small round ocellar hump: the ocellar bristles are inserted close together between the ocelli and are bent outwards and backwards; behind the hump on the vertical ridge is another pair of very tiny bristles. The vertical bristles are inserted close to the eye and bend somewhat forwards, converging at the tips. A small pair of post-vertical bristles is inserted on the hind head in such a way that the several distances between their bases and those of the vertical bristles are equal. Front view (fig. 13 *a*): the eye-profile is regularly circular, the horizontal and vertical diameters being nearly equal; the face forms a pointed triangle continuous with the frons, and is covered with pale blue dust. The eyes are touching for about one half the face depth, and all the facets are about the same size. Just above the palpi the small narrow clypeus is silvery; the palpi are small, black and hairy, and the black hairy tongue just protrudes beyond the eye-margin. Side view (fig. 13 *c*): the depth is about three times the axial width, and the eyes cover the whole side of the head, hiding even the ocellar hump. The first antennal joint is smooth and black; the second is also small and black, and is strongly saddle-shaped when detached, the third joint being held by its side flaps; it has small bordering bristles, longer above and below; the third joint is small and rounded, brownish in colour: the first joint of the black arista is stout but quite small; the next is slender and bare, merging into the microscopically pubescent flagellum. The back of the head is bronzy black with slight silvery reflections and is somewhat hollowed out. The black post-orbital row is very regularly spaced and continues almost down to the mouth margin, while the latter is provided with many long stout brownish hairs behind.

Thorax: the dorsum is quadrate and entirely steely blue-black; just in front of the scutellum is a rather narrow transverse furrow, so that the hind thoracic boundary is in the form of a well-marked ridge, which is somewhat brassy: the scutellum is trapezoidal in outline, with a uniformly rounded hind margin, and is coloured as the thorax though slightly duller. The humeri and front of the thorax are much stained with orange pollen, and the latter carries many small prescutal clothing-bristles. The chætotaxy consists of long black bristles; the acrostichal rows are, however, short but stout, and get a little longer behind, where the rows diverge somewhat. The dorsocentral bristles number 2 + 4, the front pair is small, but the bristles get progressively longer, so that the last or prescutellar pair is quite long, and converges over the scutellum; the lines of insertion diverge as usual, but the fifth pair is a little outside the range instead of inside. The upright humeral bristle is accompanied by a few long hair-like ones in front, and stands on the bright silvery part of the notopleura as do the two notopleural bristles, which are rather close together; there are also a presutural, a post-humeral, three supra-alar (the first in the notch) and a long post-alar standing on the angle of the well-developed post-alar callus. There is the usual row of bristles over the neck, and a clump of brown hairs inserted between the neck and the long dark orange-bordered stigma, overhanging the latter. The stout prothoracic bristle stands in a clump of similar hairs. The notopleura is silvery above, but like the dorsum behind; the rest of the pleura is smooth blackish green with faint silvery reflections. The scutellum bears an end-pair of long somewhat converging bristles, which are inserted about midway between the centre and the extreme basal angles; between

each and the base is a smaller bristle, perfectly parallel to the main one. The metanotum is shining black on the top and bright silvery brown on the sides. The wings are as shown in fig. 35; they are mostly clear, but are slightly smoky towards the costa; the veins are brown, and the extreme wing base is orange. The venation is as figured, the second, third and fourth veins being long, and the latter pair converging a little at the tips. The squama has the form of a small tubercle and carries a fringe of about ten long curved black hairs, the middle ones being the longest. The halteres are entirely bright orange.

The legs are almost entirely dark orange. Front legs: coxa almost black and very hairy, with a row of four or five long bristles on the anterior edge; femur dark orange, but somewhat paler towards the tip, covered with erect clothing-bristles which are longest on the upper side and short but very close and regular below: tibia with two bristles of the superior and inferior rows, the latter smaller than the former and inserted lower down, a small crown on the end: tarsus orange with first joint almost as long as the rest together, the clothing-bristles on the anterior edge forming a highly characteristic row of very regular almost hooked bristles, the other joints simple. Middle leg: coxa black and very hairy with dense stout bristles towards the end, and a single long stout bristle outside about the middle; the trochanter has a similar bristle at the tip; femur blackened and somewhat channelled, covered with close dense little bristles above, a fringe of longish hairs below, longest basally, and an anterior pre-apical bristle; tibia very dusky orange with an upper and middle pair of bristles on the anterior side, and a large accessory bristle close to the top pair; three or four bristles of the inferior row, and a crown of stout bristles; tarsus very dusky, with the joints in about the same proportion as in the front legs. Hind leg: coxa black and bare with an outside bristle at the base; femur like the middle one but larger, and with a longer and more regular fringe, the hairs having a length of about $1\frac{1}{4}$ times the depth of the femur; a single outside pre-apical bristle towards the tip; tibia blackened orange with the clothing-bristles longer and more upright beneath and behind, five or six of them a little longer than the rest, and representing the inferior row; about five rather stout bristles of the superior row; a basal and middle bristle of the anterior one, the last being the largest of all, a crown of three bristles, upper long; tarsus with the first joint about two-thirds the second and about equal to the third, with the normal clothing and basal bristles, and tiny combs at the tip of the first tarsal joint; there is a similar one on the tip of the tibia.

Abdomen: steely blue-black with the distal margins of the segments brassy; these brassy margins become narrower from base to tip, and carry short bordering bristles. The dorsum is covered with small depressed bristles, but the basal segment is nearly bare centrally, and has long black bristly hairs at the sides; similar upright bristly hairs occur thickly on the sides of the two succeeding segments, but those on the other segments are shorter and adpressed. The hypopygium (fig. 13 *d*) is complex, and the general description has been already given from the true dorsal aspect. When fully extruded the pedicel is about as long as the complete ninth segment and is rather smooth, dark, and with a few hairs. The small eighth segment is very considerably turned to the left and looks like a small hairy scale attached to the side. The ninth segment is rather shining dark orange, and strongly chitinised at the basal angle, where there is a fine long hair. The two flaps

attached to the end are roughly triangular in shape, dark orange and somewhat hairy; two smaller flaps are attached to these each side of the mid-line as mentioned before. From the tip proceed the two very long curved paranal lobes in the form of almost black pointed straps fringed with dark brown hairs, which are very long inside. In fig. 13 *e* is shown a view of what is seen in looking obliquely inside the hood. One of the rounded triangular flaps is shown seen normally, the other is seen on edge; the curved hairy paranal lobes are also shown. The complex of internal chitinous hooks is quite clearly seen from this aspect, but cannot be fully indicated in any single view. Apparently the genitalia as described are not fully exposed at first. One of the male specimens has practically the whole of the organs still hidden in the groove of the abdomen, and the only part that is free is the extreme end of the hood and the paranal straps, which protrude about midway down the venter; it is only in a quite mature insect that the complete hypopygium is freely exposed on its pedicel.

Female: this sex resembles the male in general facies and colour, the legs and their bristles are slightly stouter, the remarkable hooked fringe on the front tarsus is absent, and the fringes on the other legs are practically reduced to the ordinary clothing-bristle size. The head (fig. 13 *b*) has a broader vertex, and the face is quite wide, furrowed longitudinally from antenna to clypeus, the latter being divided from the epistoma by a curved boundary. The whole face is dark blue, densely pollinated with silver. The mouth parts have somewhat the appearance of *Porphyrops*; the palpi are large, triangular, black and densely pollinated; they are also covered with short sparse bristly hairs. The labrum is large and sac-like, the breadth of the head being a maximum at its level; it is black with a fringe of pale hairs. The aristal pubescence is slightly more pronounced than in the male, and the third joint is slightly smaller.

Length, excluding hypopygium, about 5 mm.

Loc. Seychelles. Mahé: Cascade Estate, about 1000 feet, 6 examples.

28. *Urodolichus caudatus*, n. sp. (Plate **28**, fig. 14; Plate **30**, fig. 36.)

This species resembles the former in its general characters, but is rather smaller, very much blacker in colour, and with a very different hypopygium. A fairly full description is given to avoid confusion.

Male. Head, top view: the trapezoidal frons is somewhat sunk, and is blue-black with bright green tone, the bristles as in the last species. Front view: the ocellar hump is slightly lower, the facial triangle is less produced below the antennal base and less sharply pointed, and the eye-boundary from the vertex is less curved: it is of the same colour as the frons and is somewhat depressed. The eyes touch for a proportionately longer space, and are covered with very fine short pale hairs. The clypeus is black, and the palpi are very dark orange and hairy and hide the black tongue. Side view: very much like the last species, the first two antennal joints black, the third dark orange, the arista black; the flagellum is perceptibly pubescent, the hairs being longer and more distant towards the tip. Thorax: the dorsum is black with a faint bluish tone and very obscurely pollinated. The prescutellar furrow is not quite so pronounced as in the last species, and the scutellum is slightly more rounded in profile. The chætotaxy is practically the same but the acrostichal

bristles are finer, the large scutellar pair is somewhat nearer the basal angles, and the hind pair is smaller. The pleura is black as is the metanotum, which is somewhat dusted with silver. The wing venation (fig. 36) is very much the same as in the last species, but the wings are more smoky, especially from the costa to the second vein; the veins are brown. The squama has six or seven black hairs, and the halteres have yellow knobs and brownish stalks.

The legs are predominantly brown orange with dark brown coxæ. The bristles are very much the same as in the last species but apparently there is but a single mid inferior bristle on the middle tibia and only about two on the hind tibia. The first joint of the hind tarsus is about half the length of the next and equal to the third. The peculiar hooked ciliation of the front foot is present only as an ordinary bristle row at the base.

Abdomen: very much as last in respect to bristles, etc., but somewhat violet-black with faint greenish reflections; the paler margins are very narrow. The hypopygium (fig. 14 *a*, *b*) differs considerably. The pedicel is nearly as long as the rest and is shining, black haired above. The eighth segment is somewhat dorsally placed and is dark and hairy. The ninth is black and shining, and the flaps are bright yellow with a border of hooked hairs: the small accessory flaps appear to be amalgamated with the larger ones. The orange paranal straps are considerably shorter, nearly straight, and excessively hairy; these hairs are black on the true dorsum and longest on the sides; on the ventral surface they are dense and pale. Inside the hood the angle at the insertion of the flaps is produced into a point carrying spines; centrally there is a triangular lobe below which lies the penis; the whole inside of the hood is orange. As in the last species the terminal flaps and straps are often the only part of the hypopygium that is seen, and then they project about midway down the venter.

The female differs from the male in its somewhat stouter build. The face is moderately broad, narrowest midway, with a well-marked clypeo-epistomal line; the face is dark but pollinated with yellow dust, and with a well-marked median depression. The palpi are triangular, grey and hairy, as is the large labrum.

Size, excluding hypopygium, $4\frac{1}{2}$ mm.

Loc. Seychelles. Silhouette: plateau of Mare aux Cochons, over 1000 feet, ix. 1908, 9 specimens, settling on moist places on the red earth paths. Mahé, 5 specimens: near Morne Blanc; Mare aux Cochons district, 1500—2000 feet, i.—ii. 1909.

29. *Urodolichus gracilis*, n. sp. (Pl. **28**, fig. 15.)

The third species is unfortunately represented by but a single male, and that is slightly discoloured, and has its face somewhat depressed from shrinkage; but it is so abundantly distinct that it should be readily recognisable. The actual colour is a rather dull black, and there is little doubt that the perfect specimen would have a somewhat similar colour scheme to the last species. The vertex is but little excavate, and the hump consequently not much developed; the bristles are as in the previous species but finer. The eyes are covered with minute pale hairs, but a difference arises in the fact that the eyes only touch for some four or five facets, and all the facets on the lower part of the eyes are somewhat larger than the upper ones. The small palpi are brown-black and hairy. The

antennæ are like those of the previous species in structure, but the third joint is clear orange, and the flagellar pubescence is more pronounced; the hind head is black. The thoracic chætotaxy is as in the last species, but the acrostichal rows are very much smaller and more closely set, and the accessory scutellar bristles are very small and inconspicuous; the scutellum is more rounded. The wings cannot be drawn as they are much overarching, but the venation resembles that of the last species except that the third and fourth veins are more undulated and closer at the tips; the papilliform squama has a fringe of about five long hairs; the halteres are all bright orange.

The legs, including the coxa, are entirely bright orange. Front leg: coxa with about five anterior bristles, the upper one the stoutest: femur with a sparse inconspicuous inferior pectination; tibia quite devoid of macrochætes; tarsus quite simple, first joint about as long as the rest of the foot. Middle leg: coxa somewhat haired with one large bristle outside; femur with excessively faint inferior basal ciliation and a pre-apical bristle in front at tip; tibia with one superior basal bristle, one basal and one middle bristle of the anterior row, one mid-inferior bristle and a crown of about five bristles; tarsus simple. Hind leg: coxa with one small bristle outside at base; femur with the lower clothing-bristles forming an inconspicuous sparse ciliation; tibia with the upper and middle bristles of the antero-superior row and three of the postero-superior row, a few fine bristles of the inferior row can be seen among the general clothing-bristles; a crown of about four bristles; tarsus with the first joint about half the length of the second joint and equal to the third; the first joint and the tibia carry small combs at the tip.

Abdomen somewhat shining brown-black with the clothing-bristles much as in the last species. The pedicel of the hypopygium (fig. 15 *a*, *b*) is as long as the exceptionally long hood of the ninth segment; it is flattened, hairy, and orange-brown in colour. The eighth segment is a small hairy oval inserted more dorsally than usual. The hood of the ninth segment is very long, smooth, brown-orange, and parallel sided; the flaps are very different from those of the last species; in dorsal view they are short, lancet-shaped, and the accessory small flaps are represented by two little lobes on the mid-line of the segment, which give the boundary an emarginate edge; between the main flaps and these small lobes arise the paranal lobes, which are reduced to small straight straps with bat-shaped ends. All these appendages are yellow, and the paranal lobes are covered dorsally with stout black hairs. On looking inside the hood it can be seen that its edges are strongly chitinised and bear stout hairs: the base is produced into a small central lobe carrying a long hair on each side at the angle. The long penis curls up from the bottom of the hood to the level of the tip of the tenth segment. The whole hypopygium is so very long that when bent up against the venter its end would almost attain the level of the base of the thorax.

Length, excluding hypopygium, $3\frac{1}{2}$ mm.

Loc. Seychelles. Mahé: cultivated country at about 1000 feet, xi.—xii. 1908.

Diaphorinæ.

30. *Chrysotus seychellensis*, n. sp. (Pl. **30**, fig. 37.)

The collection contains a considerable number of both sexes of a *Chrysotus* which is of the normal European form. It is not known to Dr de Meijere and does not agree with any of the well-known species. It is one of the section in which the eyes are perfectly holoptic, and the whole legs, except the femora, are pale yellow.

Male. Head: the vertex and frons are entirely green with a somewhat matt surface, the hump being slightly reddish. The face has the eyes absolutely touching with no sign of the narrowly compressed eye-margins continuing down the centre, as is so usual in the genus, the facets being truly contiguous; hence the facial triangle, which is the same in colour as the frons, is very small; the tiny brown palpi just protrude from the small mouth triangle. The antennæ are entirely black with the first joint dusted with grey. The third joint has its front profile quite rounded, even more so than in *C. neglectus*, with about the same ratio of transverse depth to axial length as in that species, but with no sign of a dimple at the insertion of the arista: the latter is similarly pubescent, but is considerably shorter, being only about two-thirds as long as the maximum vertical diameter of the eye. The bristles are quite normal; the post-ocular row is black.

The thoracic dorsum (as well as the scutellum and abdomen) is entirely coppery green with the usual reflections, and the chætotaxy calls for no remark except that the acrostichal bristles are about one-third the length of the dorsocentrals. The pleura is black and the mesopleura has fairly bright green reflections, the metanotum being similar to it. The wings are as figured (fig. 37). The squama is yellow with three or four long golden brown bristles: the halter is entirely bright yellow.

The legs differ in colour from those of the European species. Front leg: the coxa is dark with grey-green pollination, and in a side light the hairs on it are golden brown, but may be called dirty white from other aspects; inside, the coxa is much paler, and the trochanter is also pale. Outside, the femur is dingy yellowish, but behind it is slightly tinted with metallic black as in an extremely diluted form of *C. gramineus*; it is pale at the tip; the tibia and tarsus are entirely whitish yellow, and except for the small bristles on the outer side of the tibia, there are no outstanding bristles. Middle leg: the coxa is like the front one with a few stout golden bristles, and the trochanter is likewise pale; the femur is similar to the front one, but has the debilitated metallic shine on both back and front; there is a stout pre-apical bristle behind; the tibia is like the front one but carries two anterior bristles, the smaller about the middle, the stouter midway between that and the top of the tibia; there is also a crown of which the two lower bristles are the longest; the tarsus is like the front one. Hind leg: the coxa is like the others except that it has only the usual single bristle; the trochanter is the same; the femur is also like the middle one, but carries three stout bristles outside on the last fourth; the tibia is like the mid one but among the clothing-bristles stand two of the antero-superior row on the middle third, and two of the postero-superior row, one at the end of the first third, the other at the end of the second third; there is also a small crown at the tip. The tarsus is entirely

pale and somewhat more densely haired than those of the other legs, but there is no outstanding ciliation on any of the legs.

The abdomen is somewhat more coppery than the thorax, the marginal bristles are a little longer than the others; the venter is pale and carries the usual pair of tiny lobes.

Female: the same in colour as the male; the face is slightly curved at the sides and is about one-eighth as wide as the maximum head breadth, it is the same in colour as the frons, but somewhat more dusted; it carries a shallow longitudinal sulcus from just below the antenna to about half-way down the face; the palpi are black-brown and hairy. The legs are much stouter with stronger bristles; the submetallic blackening of the femora is much more intense and the pale tips of the same are reduced to the knees only.

Size 1½ mm.

Loc. Seychelles. Silhouette: Mare aux Cochons plateau and forest above, over 1000 feet, ix. 1908. Mahé: marshes on coastal plain at Anse aux Pins, i. 1909; coastal marsh at Port Glaud, 5. xi. 1908; near Morne Blanc; Cascade Estate, 800—1500 feet; Mare aux Cochons district, 1500—2000 feet, i. 1909. Anonyme Island: i. 1909. The distribution appears general, from the non-endemic vegetation at sea-level to the humid endemic forest at high altitudes.

CRYPTOPHLEPS, Lichtward, Termeszetrajzi Füzetek, XXI. 1898, p. 491.

In the collection are two species of small dark Dolichopids, which appear to be most satisfactorily placed in the above genus. They are quite devoid of acrostichal bristles, the costa stops short at the third vein, the main veins are closely approximate, and all the cross veins are practically absent. In the paper cited above a figure of the venation of the type species *C. kértészii* is given, and, on comparing it with that of one of the present species (fig. 38), it will be seen that the main difference is that in the former the fourth vein is abruptly broken and the front part is isolated and carried nearer the costa, parallel to the first, while in the latter a similar displacement occurs, but the two portions are joined by a small curve. Similar differences in venation, however, occur in the related genera *Asyndetus* and *Meringopherusa*, so that this is not a matter of more than specific importance. Further, in one of the two species the cross vein, which is said to be quite absent in *Cryptophleps*, is present as a mere "ghost" of its self; this wing is shown in fig. 38. The cross vein's "ghost" occurs between the fourth and fifth veins. In some of the males of both species the heads are rather shrivelled and in one of the species the exact form of the palpi cannot be seen, but in the other they agree with the form described for the genus.

31. *Cryptophleps ochrihalteratus*, n. sp. (Pl. **29**, fig. 18; Pl. **30**, fig. 38.)

Head (fig. 18*a*): vertex and frons fairly flat, all dull granulated black with practically no hump. The ocellar bristles are long, divergent and bent backwards; the large subparallel verticals bend forward; they are inserted very close to the eyes and in a line with the ocellars. The eyes are minutely pubescent, especially in front, and their margins on the vertex are completely absent up to the level of the antenna, where they suddenly appear in the form of densely golden-pollened bands which extend over the face to the epistoma, their edges being just separate on the middle of the face; when the head is

shrivelled, the eyes practically touch; the triangular spaces thus left below the antennæ and above the mouth are black. The epistoma is slightly concave on its margin and is marked off from the slightly depressed clypeus. The tongue is dark and the palpi are in the form of large flattened somewhat silvery discs carrying a few tiny scattered black hairs. In side view (fig. 18*b*) a pair of small post-vertical bristles can be seen behind the vertex: the post-orbital row is black and merges into long pale bristly hairs round the mouth. The antenna is entirely black, the first joint small; the second also small with marginal bristles, longest on the top; the third is triangular with a hairy tip, and the dorsally inserted arista is thick at the base, tapering to the tip and haired. The thoracic dorsum is all dull black and granulated; the four long dorsocentral bristles lie on almost parallel lines and the acrostichal bristles are completely absent; the rest of the chætotaxy is normal. The scutellum is like the thorax; it is flattened on the top and carries a pair of converging bristles inserted midway between tip and base. The pleura is faintly greyish but is also granulated in texture. The wings are as in fig. 38; they are slightly darkened costally and there is a "ghost" of the cross vein. The halteres are entirely orange with a large knob.

The legs are all black-brown, the coxæ and femora being very faintly silvery greyish; all the clothing-bristles are stout and in very regular rows. All the tarsi carry well-developed white pads, which are of about equal size on all the feet, and white empodia. The ends of the pads are densely pectinate and the empodia are conical in form; there is no sign of true claws, and the dorsal side of the flattened last tarsal joint bears stout bristles. The front coxa is bristled in front. The mid tibia carries two bristles of the anterior row, the smaller about midway, the other half-way between it and the base; it also carries a crown of which the lower bristle forms a spur. The hind coxa has the usual bristle, the femur bears an inferior row of about ten fine bristles, the last being long; the tibia resembles the middle one but the crown is small.

The abdomen is like the thorax in colour and texture but is very slightly shining. The last segment carries a small round knob with the usual four bristles of *Diaphorus* but very much finer.

The female resembles the male, but has a much broader face which is all granulated like the frons; the palpi are black and smaller than in the male, and there are no foot pads.

Size a little over 2 mm.

Loc. Seychelles. Mahé: near Morne Blanc, about 1000 feet, x.—xi. 1908, 1 ♂, 1 ♀; Cascade Estate, about 800 feet, 1 ♂.

32. *Cryptophleps nigrihalteratus*, n. sp. (Pl. **30**, fig. 39.)

While this species is easily separable from the first, the general description applies closely except for the following points. The head of the male was so contracted round the mouth margin that it was not possible to see the palpi, but one would judge that the oral orifice is considerably less open than in the former species. The whole insect is somewhat less granulate in texture. The venation differs as shown in fig. 39, the "ghost" being absent. The inferior fringe on the hind femur is stouter, the foot pads are considerably smaller, and the halteres are entirely black.

Sizes as in last species.

Loc. Seychelles. Mahé: near Morne Blanc, about 1000 feet, x.—xi. 1908, 11 examples.

Campsicneminæ.

Acropsilus, Mik.

It is of considerable interest to find this mid-European genus in the Seychelles. So far it was known only from a single European species, *Acropsilus niger*, Loew., from Hungary and Denmark, since discovered by the author in North Cornwall. There is a series of specimens in the collection which agree almost absolutely in the generic characters with that species, though the Seychelles species is much more robust and is abundantly distinct.

33. *Acropsilus errabundus*, n. sp. (Pl. **29**, fig. 19; Pl. **30**, fig. 40.)

The Cambridge collection fortunately contains the Cornish pair of the rare European species referred to above, and as this is the only other member of the genus, the close relationship between the two species could be readily seen. They agree in the structure of the head, having the eyes practically touching below the antennæ in the male, and somewhat separated in the female. The front eye-facets are much enlarged in both species, and the antennæ are quite similar except for a longer arista in the Seychelles specimens. The venation and bordering ciliation are very similar, and they are both absolutely devoid of any sign of acrostichal bristles. The Seychelles insect differs in its yellow legs, which are vastly longer than in *A. niger*, and the hypopygium is much more developed, though quite similar in general structure. The creature is also much larger, being about 2·3 mm. long without the antenna instead of just about 1·5 mm. Unfortunately the insect being of delicate structure, the head of every specimen is more or less shrunken and deformed, and hence no satisfactory figure can be given.

Head: the vertical ridge is gently convex, with the ocellar tubercle only slightly prominent. The whole of the vertex and frons is æneous green-black, with the hump but little differentiated; the frons is trapezoidal in outline, being narrowed towards the front. The large black ocellar bristles are inserted between the ocelli, and are fairly straight, divergent and pointing forward. The vertical bristles are similar and are inserted absolutely on the edge of the eye and just remote from the vertical ridge; they converge a little and are directed forward. The vertex is just overhung by another very tiny pair of bristles, but there is no sign of true post-verticals on the black hind head. The face contracts sharply at the level of the antennal bases so as to leave a black facial triangle which is roughly equilateral, the eyes then practically touch for about five facets, and the face diverges again below, the lower part of the same being hidden by the conspicuous black-brown hairy palpi. The enlargement of the eye-facets is quite exceptional and extends over all the front part of the eyes: these are densely covered with very short inconspicuous hairs. The antennæ are almost the same as those of *A. niger*, with a small pointed third joint, somewhat shorter than the second, which itself bears a few hairs above: they are black, the third joint being densely covered with brown pubescence: the arista is distinctly dorsal and its point of insertion is marked by a dimple in the edge of the third joint: the flagellum is nearly as long as the thoracic dorsum and is hairy, the hairs getting thinner towards the tip. The post-ocular bristles are distinctly visible above and are black.

Thorax: the dorsum is shining bluish-black with an extremely sparse golden pollination, and bears no acrostichal bristles whatever, being quite smooth. There are five dorsocentral bristles, if we include a small one on the front of the thorax and the prescutellars; these are practically collinear, the lines diverging a little behind. There are also a large humeral bristle, a smaller post-humeral, a presutural, three supra-alar (the last large) and a large post-alar. The pleura is somewhat shining black with a silvery lustre, and the scutellum is rounded in profile, rather flattened on the disc which is slightly roughened and dark black-brown in general colour, with a more shining central line; the bristles are inserted about half-way between the centre and the base, they are long and stout and just cross at the tips. If the scutellum is viewed so as to see its under surface, this is found to be somewhat hollowed out, and the metanotum bears a small central papilla which is normally hidden by the scutellum. The metanotum itself is similar in texture to the pleura and its distal border is formed by a ridge which extends as a well-marked epiphragma over the hind edge of the hind coxa. The wings are shown in fig. 40: they are very slightly darkened and have brown veins; the costa is bristled as usual and the rest of the wing is beautifully ciliated round the margin. The thoracic squama consists of a small tubercle bearing a few black hairs. The halteres are yellow with the stalk very slightly darkened above.

The legs are remarkable for their length, and it may be of interest to give the lengths of the principal joints to compare with that of the insect, which is 2·3 mm., the wings being 2 mm. The front coxa is 0·7 mm. long and the other joints are as given in mm. in the table below.

	Femur	Tibia	First tarsal joint	Second tarsal joint	Third to fifth tarsal joints	Total
Front leg	1·05	1·12	0·88	0·50	0·77	4·32
Middle leg	1·05	1·65	0·66	0·53	0·66	4·55
Hind leg	1·05	1·65	0·18	0·74	0·80	4·42

The legs are entirely pale orange except for the mid coxa, which is very slightly darkened on the side. On the front leg the coxa bears pale hairs which are more bristly towards the tip; the rest of the leg has nothing but the clothing-bristle rows. All the femora are somewhat spindled. The middle leg has a tiny pre-apical bristle on the femur, and the tibia has the top and mid bristle of the posterior row and a small crown, the lower bristle of which forms a spur. All the tarsi bear the usual pair of bristles at the base of each joint. The hind coxa bears a small bristle outside, and the femur has a tiny pre-apical bristle, the tibia has an ill-defined row of three inferior bristles standing among the clothing-bristles, two small bristles of the posterior row, and a small terminal crown. On the first tarsal joint which (as seen in the table) is very short, the bristles form two elegant rings, and the terminal comb is well developed.

The abdomen is brown-black, slightly shiny, with the margins of the segments narrowly but sharply paler: the venter is quite pale: the abdomen is conical in plan with the first segment bordered by the epimeral ridge; it has moderate bristles, somewhat stouter

marginally. The hypopygium is large and of the form shown in fig. 19, with a curiously angled pedicel and with white, pale-haired, pointed paranal lobes.

The female differs from the male by its stouter build with stronger bristles on the shorter legs. The face does not meet below, and is blue-black in colour. The clypeus carries about six stout hairs, and the palpi are like those of the male.

Loc. Seychelles. Mahé: Port Victoria, xii. 1908, 1 ♂; marshes on coastal plain at Anse aux Pins, i. 1909, 13 ♂, 3 ♀; marshy ground near sea-level at Cascade, 20. ii. 1909, 1 ♀. Appears to be confined to places at sea-level, where the vegetation is entirely non-endemic.

Sympycnus, Loew.

In the *Tijdschrift voor Entomologie* for 1916, vol. LIX. p. 244, Dr de Meijere describes several species which he refers to this genus, but which for the most part have the eyes touching below the antennæ and very often have the first and second joints of the hind tarsi both short, with the second joint bearing an extraordinary appendage. There is a species in the collection which can well be referred to *Sympycnus*, but is not quite so aberrant; the face is fairly wide below the antennæ, and the first joint only of the hind tarsus is very short. The general appearance of the insect is not very reminiscent of the ordinary European forms, as it is more delicate and far less bristly, but the differences are not sufficient to warrant the erection of a new genus for a single species.

34. *Sympycnus violaceus*, n. sp. (Pl. **29**, fig. 20; Pl. **30**, fig. 41.)

Male. Head: the vertex and frons are quite smooth and polished, violet in colour with greenish reflections. In profile the top edge of the vertex is gently convex with the ocellar hump but little prominent; the hump itself is dark, matt, with chestnut ocelli. The ocellar bristles are inserted midway between the ocelli and are long and divergent, set upright on the frons, and but slightly curved: there is a pair of tiny bristles on the back of the hump. The vertical bristles are inserted just at the upper eye-margins close to the vertical ridge. The insects are very delicate, and the heads have mostly shrunk a good deal; but one can just see that there is a pair of post-verticals inserted a long way down the back of the head. The post-orbital rows, as well as all the above bristles, are black. The face is continuous with the frons and narrows a little from the antennæ to the epistoma, but the eyes are separated by a distance of at least one-third the width of one eye. The surface of the face is slightly depressed and is polished violet; the palpi are brown and hairy. The eyes are clothed with dense stubbly hairs which are considerably longer than is usual with eye pubescence. The antennæ are conspicuously large, and in form are very like those of *S. annulipes*, except that the third joint is more perfectly triangular in outline, though the extreme tip is slightly more rounded; all the joints are blackish brown; the second joint has small marginal bristles, and the third is entirely and densely pubescent. The basal joints of the arista are long, and the flagellum is very pubescent from base to tip, the hairs are unusually stout, being longest proximally, where they are longer than the cross diameter of the basal joints.

Thorax: the dorsum is entirely polished and violet in colour, the colour being very strong. There are five pairs of dorsocentral bristles, including the prescutellars, and these

are all collinear, the lines of insertion diverging a little behind. The single rowed acrostichal bristles extend from right over the front of the thorax to a little beyond the second dorso-central pair; they are quite conspicuous and increase in length from front to back. The humeri are somewhat orange and carry a large bristle, and the rest of the thoracic bristles are normal. The pleura is all somewhat dull orange; the squamæ are in the form of small tubercles with a fringe of some five black hairs. The scutellum is fairly rounded in profile, quite flat dorsally and is of a true brassy colour and somewhat shining; the end bristles are inserted about midway between the base and the tip, very long, and nearly meeting at the tips. The metanotum is large with its axial length much more than usual; it is smooth and grey-orange in colour. The wings are as shown in fig. 41, and have extremely elegant bordering ciliation to the wing margin; the veins are pale brown. The halteres are dull orange and of a remarkable form, the heads being large and regularly ellipsoidal with a very short stalk.

The legs are entirely yellow and very long. The coxa is as deep as the pleura, the femur somewhat spindled and about as long as the abdomen. The front tibia is about as long as the femur, and the tarsi about $1\frac{1}{2}$ times as long with the first joint nearly as long as the next two together, these being about equal. The mid-tibia is longer than the femur and the tarsus is about as long as the tibia, with the joints much in the same proportion as those of the front feet. The hind tibia is also about $1\frac{1}{2}$ times as long as the femur, but the tarsus is only about two-thirds the tibial length. The first joint (fig. 20) is very short; on its inner side it bears two combs, the distal one of which forms a complete hood, from which issue some long curved hairs, and the base of the joint carries two very long fine hairs hanging down below; the second joint is quite normal and is about $2\frac{1}{4}$ times the length of the first; the third, fourth and fifth are progressively smaller. As regards bristles, each femur has a very thin pre-apical bristle, each of the mid and hind coxæ carries a single fine bristle; the middle tibia has an anterior bristle pair near the base; the hind tibia has a row of two very fine inferior bristles, and a superior row of three slightly stouter bristles. The clothing-bristle rows are very neatly ranged, and are all golden when viewed obliquely.

The abdomen has the first segment with its base about twice the breadth of the narrowed end of the metanotum, and the outline tapers thence to the tip; the second segment is about twice as long as the others. The colour is greyish orange, the bristles are small, even the bordering ones are conspicuously long only on the first segment. The genitalia are of the form usual in the genus, being very small and inconspicuous.

Female. This sex is notably larger and stouter; the legs are relatively shorter and more powerful, and the middle tibia carries two outer bristles in a row as well as the basal pair. The hind tarsus has a similar first joint, but lacks the curved hairs and the long basal pair. The palpi are larger and more orange. The third joint of the antenna is much smaller than in the male, being only about as long as the two first joints together.

Size. Male about $1\frac{1}{3}$ mm. Female about $1\frac{3}{4}$ mm.

Loc. Seychelles. Mahé: near Morne Blanc, x. 1908, 1 ♀; Cascade Estate, between 800 and 1500 feet, i.—iii. 1909, 6 ♂, 5 ♀; Mare aux Cochons district, 1500—2000 feet, i.—ii. 1909, 1 ♂, 3 ♀. All the specimens are from places at moderate or high elevations, either in or near the endemic forests.

35. *Campsicnemus*, sp.?

There are a single male and four females of an undescribed species of this genus, but unfortunately the male has lost the middle and hind legs and is otherwise imperfect, so that it is impossible to describe the species.

Loc. Seychelles. Silhouette: forest above Mare aux Cochons, over 1000 feet, ix. 1908, 1 ♀. Mahé: Cascade Estate, about 1000 feet, 1909, 1 ♂; marshy ground near sea-level at Cascade, 20. ii. 1909, 1 ♀; marshes on coastal plain at Anse aux Pins, i. 1909, 1 ♀; Mare aux Cochons district, 1500—2000 feet, i. 1909, 1 ♀. This curious distribution, in the coast-marshes and in the mountain-forests, indicates the possibility of two species being included under the females.

Medeterinæ.

36. *Medeterus grisescens*, de Meijere, Tijd. v. Ent. LIX. 1916, p. 259. (Pl. **30**, fig. 42.)

There are two males and four females which are referred by Dr de Meijere to this species. They agree very well indeed with the published description, but the thoracic dorsum of the female has not the conspicuous brown band there referred to, or at least it is far less conspicuous than the description would lead one to expect. In any case this is probably nothing but a local variation. Seychelles, Mahé: Cascade Estate, about 1000 feet. Described from Java (Batavia, etc.). This species occurs in a collection recently received by the author from Ceylon.

37. *Medeterus*, sp.?

There is a single specimen of the female of another species which must be fairly close to *M. longitarsis*, de Meijere, *l.c.*, p. 262. It differs somewhat in the degree of convergence of the second and third veins. Seychelles, Mahé: Cascade Estate, about 1000 feet, iii. 1909.

Hydrophorinæ.

38. *Hydrophorus præcox*, Lehm.

Two males and a female, collected in Aldabra, appear to belong to this species: they are slightly less robust than European specimens, but are quite inseparable therefrom. Aldabra: running on the surface of the water of a well at Takamaka (almost the only fresh water in the atoll), xi. 1908 (Fryer). Also found in Rodriguez (Snell and Thomasset, 1918), Europe, West and South Africa.

39. *Thinophilus*, sp.

There is a single female specimen which appears to belong to this genus. Aldabra: running on the surface of the fresh water in a well at Takamaka, xi. 1908 (Fryer). See note under *Hydrophorus præcox*.

Pipunculidæ.

PIPUNCULUS, Latreille (*Dorylas*, Meigen, 1800, emend. Kertesz).

The collection includes five species of this genus, and it is somewhat remarkable that they fall into the five sections represented among our British species, including one of the *zonatus* group, one of the *vittipes*, one of the *campestris*, one of the *confusus*, and one of the *sylvaticus* group. In two cases the resemblance to British species is, apart from size, extraordinarily close, and can be seen almost at a glance. It is unfortunate that most of the published descriptions of exotic species do not contain any information as to their relationships to the main European sections; such information would be of the greatest assistance in identifying these insects, which in many cases are so extraordinarily close one to another.

40. *Pipunculus*, sp. (Pl. **30**, fig. 43.)

The first species, that belonging to the *zonatus* group, is represented by two females only, and it is thought best not to give it a name. In Kertesz's table given in the *Ann. Mus. Nat. Hungarici*, 1912, p. 285, it comes in the neighbourhood of Perkins' species *cruciator*, and indeed the description and figure of that species as given in the Reports of the Hawaiian Sugar Planters' Experimental Station, Bulletin I. part 4, agree in broad outline with the specimens, though it is clear that they refer to a different species. Hence a description will be given in the hope that it may be possible to fit in a male from other or later work. The description will be made with reference to an ordinary female of *zonatus*, which, like the present species, has the hind femora brilliantly shining behind.

Head: frons and face identically the same, the first two antennal joints brown-black, the third joint somewhat more acuminate, the actual joint being orange with the acumination about the same length as the joint itself, but silvery. The facets of the eyes and the hind eye-margins are the same in size. The thoracic dorsum is dull black with an olive green tone; the extremely fine hair lines are slightly pollinated with a rusty coloured pollen. The prothorax carries the same silvery spots, but the humeral knobs are clear yellow; the scutellum is just a little less swollen, but carries the same faint ciliation. The whole of the pleura and metanotum are similarly, but more brightly, dusted with silver. The venation is as shown in fig. 43. The halteres are orange, with the extreme base of the stalk black.

Structurally the legs are practically the same, including the femoral serration which occurs also on the front legs, but the claws are longer than the pads. The colour is quite different as the tibiæ are all orange though a little dusky and silvery in front; the tarsi are clear orange but for the dusky last joint; all the femora are blackened except at the extreme knees, and have slight silvery dust especially behind; the last pair are brilliantly shining behind.

The abdomen has the same sort of pattern with a russet dorsum and silver side spots; the latter are very like the figure of *cruciator* (*l.c.*, Pl. V, fig. 1) except that the spots encroach a little less on the rest of the dorsum. The terminal part differs from that of *zonatus*; the bulb is devoid of the longitudinal sulcus; the aculeus is much flattened at the base and is long and bright orange. The lengths of abdomen, bulb and aculeus

are about 2·2, 0·33 and 0·77 mm. respectively. The venter has a similar broad black band extending along the membranous part.

Length, without ovipositor, about $4\frac{3}{4}$ mm.

Loc. Seychelles. Silhouette: plateau of Mare aux Cochons, over 1000 feet, ix. 1908. Mahé: Cascade Estate, 800—1000 feet.

41. *Pipunculus semiopacus*, n. sp. (Pl. **30**, fig. 44.)

This species is represented by a single pair. Unfortunately the male is just a little rubbed, but there is no doubt that it belongs to the short winged section of the *vittipes* group, having a similar facies and abdomen, including the small orange protuberances on the venter, the non-carinate but non-rounded third antennal joint, and other characters in common. It appears to be related to Kertesz's species *P. fumipennis* and *P. sauteri*.

Male. Head: the long dull black narrow vertical triangle extends from the ocelli nearly half way down to the frontal triangle; the latter is brilliantly shining silver; the eyes are reddish. The antennæ have all the joints yellow, the second bristled below, the third silvery at the tip which is very slightly carinate, the spike being about one-fifth the length measured along the outline of the third joint from the extreme tip to the insertion of the arista. The small first joint of the arista appears to be orange; the second is elongate and swollen at the base, and together with the flagellum is black. The face is all bright silvery; the hind head is black with silver dust on the lower part of the hind margins of the eyes.

The thoracic dorsum is dullish black, but may be slightly rubbed or discoloured. The humeral scales are strongly developed and are orange with a bright silver triangular spot inside each. The dorsum is practically bare except for the usual extremely fine hair rows, but is somewhat more hairy on and behind the humeri. The scutellum is similar to the thorax but is exceptionally hairy, the hairs being black, especially long on the hind margin. The metanotum is pollinated with grey, with two shallow flat tubercles on each side which are more highly pollinated than the rest and are very conspicuous, appearing like side spots. The pleurae are entirely covered with grey pollen. The venation is as figured (fig. 44), and the sharp line of demarcation at the boundary of the stigma should be noted. It is not a true vein as is described in Perkins' species *P. heterostigmus* but is a marked feature of the insect. The halteres are entirely orange.

Legs: all the femora have double rows of serration; those on the front and middle pairs extend all along the femur but are quite small; those on the hind pair extend along the distal half and are quite stout; the hind pair are shining behind. The hind tibia is a little curved, with a stout row of clothing hairs of an orange colour, which are especially long on the front side, and one of which stands out almost like a small bristle. In colour the legs are mainly orange, but the two front pairs have the femur slightly dusky and silvery behind; the last pair has a darkened ring occupying about two-thirds the length, which just leaves the knees orange. All the tibiæ and tarsi are orange, and the dorsum of the last tarsal joints carries exceptionally strong bristly hairs; the claws have the usual black tips.

The abdomen has the first segment with its basal portion consisting of a slightly

depressed dull brown arc which leaves the rest of the segment slightly dusted; it carries about five stout bristles on each side. The second segment is lightly dusted on its upper half, but its lower half and all the other segments are of a fairly shining black with a suspicion of rusty pollination; they are more hairy than usual. The second to fifth segments bear the usual silver side spots, which are biggest on the fifth segment, which itself is about one-fourth longer than the previous one. The hypopygium is about half the axial length of the fifth segment, and has a large shallow depression on the tip. The venter bears two small somewhat silvery orange lobes at the level of the third segment.

Female: vertex and frons entirely silver-grey except for the actual tubercle itself which is shining: the margins are bordered with a line of excessively minute but distinct black dots. As in members of this section, the eyes are nearer together at the ocelli, and again at the level of the antennæ, than midway, so that the frontal eye-margins are gently curved; the face is black with profuse silver pollen all over. The antenna has its basal joints large and black, not pale as in the male; the third joint is thickly covered with grey pollen and is sharply pointed though not strictly acuminate. The arista has both the basal joints about equally swollen and long-oval in form; both those joints and the flagellum are black. The hind head has the eye-margins swollen, especially so above, and these are entirely covered with grey pollen, though the absolute hind head is black.

The thoracic dorsum is entirely dull black, but with an illumination directed from the scutellar direction it is possible to see three faint lines that are a little darker than the rest. The humeral tubercles are well developed and are pollinated in grey exactly as are the hind eye borders; in front of each is a pollen patch; the post-alar calli are stout. The pleura is covered with dark grey pollen which is especially strong just above the notopleural suture. The wings have the same dark margin to the stigma as the male, and the halteres are also orange.

The legs have the coxæ and femora all black except for an orange tip to the latter; the femora are all shining beneath, the hind pair being also shining behind, the others being there slightly silvery. The tibiæ are orange, a little darker behind, the last pair having a distinct dark ring on the distal half which just leaves the tip orange. The tarsi are all orange except for the slightly darkened last joints; the pads are about as long as the claws. On the distal half of the under side of the mid and front femur there is a fine serration, and the hind femur carries a double row of similar but longer serrations in the same place. The notopleura is all grey with distinct silvery side spots. The abdomen has its dorsum somewhat olive black, and is very slightly shining. The first segment bears the same arched brown basal part as does the male, which leaves the rest of the segment silvery in the form of two triangular side spots connected by a narrow thread. The second segment is nearly all silvery, and the three following bear the normal well-marked silvery triangular side spots. The last segment is large, being about twice the depth of the previous ones which are equal, and is fairly silvery except just in the middle. In side view the third to fifth segments appear banded, the basal third being olive brown, the rest grey-silver. The bulb of the ovipositor is a long-oval and very shining black, the aculeus is orange, about as long as the bulb and in profile is excessively curved like a sabre. The lengths of abdomen, bulb and aculeus are about 1·4, 0·4, 0·44 mm. respectively.

Length, without hypopygium, about 4½ mm.

Loc. Seychelles. Silhouette: plateau of Mare aux Cochons, over 1000 feet, ix. 1908. Mahé: marshy ground near sea-level at Cascade, 20. ii. 1909.

42. *Pipunculus depauperatus*, n. sp. (Pl. **30**, fig. 45.)

This species is extraordinarily like a small depauperated form of the well-marked group which includes *campestris*, Latreille (sens. Verrall nec Becker). It possesses the same short rounded third antennal joint, the same type of head and eye, and the same alternate banding of the abdomen in dull and shining bands on the segments. It differs in size, being about 2¼ mm. long with a wing length of about 2¾ mm. against corresponding values of about 4 mm. for *P. campestris*. The simplest method of description is to compare it with that species, bearing in mind this difference in size.

Male: the head in profile is slightly longer axially than in depth, with the same puffed out silvery hind margins to the eyes; these are of the same reddish colour, and the facets are also very slightly larger in front than behind, in fact only just perceptibly so. The antenna is the same in structure with a similar large swollen basal joint to the arista, though the second joint is quite thin; the third joint is just as regularly rounded at the tip. The frons differs somewhat in that the triangle above the antennæ is all shining with silvery margins, and not dull with a grey triangle over the base of the antennæ. The face is very similar, but is practically all shining black. The hind borders of the eyes are dusted with silver.

The thoracic dorsum is the same with the same kind of rusty pollen, the hairs are excessively fine and very sparse, and the scutellum is the same in form with similar sparse hairs to those on the dorsum; the pleura is also similar.

The legs differ slightly in colour; they are orange with very slightly darker tone on the femora and the main part of the tibiæ, but not truly darkened in those places. The hind femur is not thickened nor is the tibia so much bent as in *P. campestris*, and the very stout rows of spines which occur beneath the legs in that species are replaced by small toothed serrations. The most striking point is the almost complete absence of the plentiful pale hairs on the legs. The tarsi are all yellow, but have the same long hairs on the last joints. The venation is as shown in fig. 45, the stigma often being faint as is not uncommonly the case with *P. campestris*.

The abdomen is all black with the margins of each segment shining, the rest almost velvety, and almost the whole of the last segment shining, and is very like that of *campestris*, except for the margins being slightly broader than is usual in that species, and that there is practically no sign of grey side spots. The hypopygium is similar in outline, with a similar, though smaller, orange pit in the middle.

Female: this sex is even more like that of *campestris*. The head differs in that the vertex is more shining black with dusted side margins and is not dull; the third antennal joint differs considerably in as much as it is not pointed, but perfectly rounded at the tip as in the male. The outline of the abdomen in vertical view is less curved, and there are no grey side spots. The ovipositor has a more spherically shaped bulb and the orange aculeus is shorter, less stout, and almost straight. The lengths of abdomen, bulb and aculeus are about 0·9, 0·25, and 0·33 mm. respectively.

Length 2½ mm.

Loc. Seychelles. Silhouette: high forest above Mare aux Cochons, 1000—2000 feet, ix. 1908. Mahé: from near Morne Blanc, about 1000 feet, x.—xi. 1908; Mare aux Cochons district, about 1500 feet, i.—ii. 1909; Cascade Estate, 800—1500 feet, i.—iii. 1909.

43. *Pipunculus confusoides*, n. sp. (Pl. **30**, fig. 46.)

This is an exactly parallel case to the last, as the insect is even still more like a depauperated form of the British species *P. confusus*. Again its most striking difference is that it is still smaller in proportion, being just under $2\frac{1}{2}$ mm. long with wings of about the same length, instead of having those dimensions about $4\frac{1}{2}$ mm. This species will also be described by comparison with its related species, *P. confusus*.

Male: the head is the same with the non-touching eyes, the silvery face and lower part of frons, the very sudden constriction forming the rostrate end of the third antennal joint, and the similar slight disparity between the hind and front eye-facets. The thorax and scutellum are almost identical, even to the tiny hairs on the latter, but the dusting is less. The legs have similarly darkened femur and ringed tibia, but only the last tarsal joints are darkened. The venation is as shown in fig. 46.

The abdomen is not so cylindrical in section, but is slightly flattened and is different in appearance owing to its being somewhat suffused with rusty pollen; the hypopygium is a little less asymmetrical. The orange ventral laminæ so characteristic of this section of the genus are smaller than in *confusus*, and are not inserted quite so far up the venter; this is largely due to the less robust build of the insect, the final abdominal segments being considerably less well developed in proportion than in *confusus*.

Female: this sex agrees very closely indeed with *confusus*, having the same exceptionally rostrate antennæ and a similar long basal joint to the arista; the anterior eye-facets are enlarged in exactly the same way. The legs also are the same both in form and in colour. The abdomen is not shining, but is dusted with a somewhat grey-bronze pollen and no hairs can be seen; it differs considerably in the form of the ovipositor. In *confusus* the bulb is long, and the very straight orange aculeus reaches nearly to the base of the second abdominal segment. In the present species the bulb is much shorter and is rounded, the orange aculeus is not absolutely straight and is quite short, reaching about half-way along the third segment. The lengths of abdomen, bulb and aculeus are about 1·0, 0·25 and 0·5 mm. respectively.

Size about $2\frac{1}{2}$ mm.

Loc. Seychelles. Mahé: near Morne Blanc, about 1000 feet; Cascade Estate, about 1000 feet; marshes on coastal plain at Anse aux Pins, i. 1909. Anonyme Island (a small coconut-planted islet near Mahé), i. 1909. One example from each locality.

44. *Pipunculus sylvaticoides*, n. sp. (Pl. **30**, fig. 47.)

There is a single male and three females of a species belonging to the group that includes *sylvaticus*, Meigen, *nigritulus*, Zett., and *pilitarsis*, Verrall, and there can be no doubt that *P. æneiventris*, Kertesz (*Ann. Mus. Nat. Hung.* I. 469) is another member of the section. Unfortunately the head of the male has become detached and in fixing it to the block the antennæ have been distorted, and the head colour destroyed, but the specimen agrees extremely closely with Kertesz's description. He did not know the female of *æneiventris* so it is thought best to append some remarks on the present specimens.

They bear a very close resemblance to the well-known species *P. sylvaticus*, the main difference being that they are smaller, being somewhat more than two-thirds the size of that species. As regards the male the whole appearance is extraordinarily like that of *sylvaticus*, but the venation is different as shown in fig. 47, from which it will be seen that the second vein ends much further back along the costa. The hypopygium is also different; instead of being somewhat quadrate in outline as seen from above it is distinctly rounded, smaller, and with a smaller depression on the end. In respect to limb colour, clothing-bristles, etc., the resemblance is almost absolute, so that no further description is required. The difference between this species and the description of *æneiventris* is principally in the fact that the femora are not black quite to the tip, and the tiny bristles at the tip of the hind femora are not to be seen.

The female also resembles that of *sylvaticus* very closely but the following points, as well as the venation, differentiate it. The antennæ are somewhat less rostrate. The orange aculeus extends only about as far as the end of the third abdominal segment instead of nearly to the base. The legs are identical in colour, etc., in all respects except for the tarsi; these are longer and more slender, being about as long as the tibia instead of considerably shorter; the separate joints are produced above backwards in the same way as in *sylvaticus*. The characteristic pair of bristles at the base of the front femora is absent. The abdomen is faintly shining purplish black. The lengths of the abdomen, bulb and aculeus are about 1·13, 0·28 and 0·28 mm. respectively.

Length about 2 mm.

Loc. Seychelles. Silhouette: marshy plateau of Mare aux Cochons, about 1000 feet, ix. 1908, one example. Mahé: near Morne Blanc, about 1000 feet, x.—xi. 1908, two specimens.

Syrphidæ.

Specimens of each species of the Syrphidæ were examined by Dr Mario Bezzi. With the exception of a new species, *Eristalodes seychellarum*, they are all widespread. Dr Bezzi reported on them in his *Syrphidæ of the Ethiopian Region*, British Museum, 1915.

45. *Melanostoma annulipes*, Macquart, var. *mauritianum*, Bigot: Bezzi, *op. cit.* p. 21.

Loc. Seychelles. Silhouette: high damp forest near Pot-à-eau, about 1500 feet, viii. 1908, two examples. Mahé: high forest of Morne Blanc, 1500—2000 feet, x.—xi. 1908, two specimens; Cascade Estate, 800—1500 feet, i.—iii. 1909, six specimens.

M. annulipes is widespread in Africa.

46. *Xanthogramma ægyptium*, Wiedemann: Bezzi, *op. cit.* p. 37.

Loc. Seychelles. Silhouette: high damp forest, about 1500 feet, viii. 1908. Mahé: Forêt Noire district and Cascade Estate, both about 1000 feet, x. 1908—iii. 1909, seven specimens. Long Island (a cultivated islet near Mahé), vii. 1908. Coetivy: ix. 1905, four examples. Chagos: Peros Banhos Atoll, 25. vi. 1905, two examples. Common throughout the Ethiopian Region.

ERISTALODES, Mik, 1897 ; Bezzi, *op. cit.* p. 87.

47. *Eristalodes seychellarum*, Bezzi, *op. cit.* p. 91, fig. p. 92.

Loc. Seychelles. Silhouette : high damp forest near Pot-à-eau, about 1500 feet, viii. 1908, one example. Mahé : Cascade Estate, about 1000 feet, 1908—9, 1 ♀ ; 1914, 1 ♀ (Thomasset) ; also the type (♀).

Three larvæ of an Eristaline were found in the water and humus between the leaf-bases of a growing endemic *Pandanus*, in the forest above Mare aux Cochons (Silhouette), considerably over 1000 feet, 22. ix. 1908. As no other Eristaline fly was taken in the islands, and as the adults of *E. seychellarum* were, like the larvæ, all found in the endemic forests at high elevations, there is very little doubt that these larvæ are larvæ of *Eristalodes seychellarum*.

VOLUCELLA, Geoffroy.

48. *Volucella obesa*, Fabricius.

Many specimens of this cosmopolitan species from Seychelles and Chagos. Seychelles : Silhouette, from the coast at La Passe, from the plateau of Mare aux Cochons, over 1000 feet, and from the forest near Pot-à-eau, about 1500 feet, viii.—ix. 1908 ; Mahé, Cascade Estate, Forêt Noire district, etc. ; Praslin, 1905. Chagos : Diego Garcia Atoll, 2. vii. 1905.

EXPLANATION OF PLATES.

The lines of measurement beneath certain of the figures always represent 1 *mm., unless otherwise stated.*

Plate 27.

Fig. 1. *Psilopus leucopogon*, Wied.; *a*, head, front view; *b*, head, side view; *c*, hypopygium.

Fig. 2. *Psilopus lasiophthalmus*, n. sp.; *a*, head, front view; *b*, head, side view; *c*, hypopygium.

Fig. 3. *Psilopus bilobatus*, n. sp.; *a*, head, front view; *b*, head, side view; *c*, hypopygium; *d*, tarsus, terminal segments. Line represents 0·2 mm.

Fig. 4. *Psilopus librativertex*, n. sp.; hypopygium.

Fig. 5. *Psilopus pollicifer*, n. sp.; *a*, head, front view; *b*, head, side view; *c*, tarsus of front leg; *d*, last tarsal joint of front leg (line represents 0·1 mm.); *e*, hypopygium.

Fig 6. *Psilopus magnicaudatus*, n. sp.; hypopygium.

Plate 28.

Fig. 7. *Psilopus grandicaudatus*, n. sp.; hypopygium.

Fig. 8. *Psilopus amplicaudatus*, n. sp.; hypopygium.

Fig. 9. *Craterophorus permirus*, n. sp.; *a*, head, front view; *b*, terminal segments of tarsus, front leg (line represents 0·5 mm.); *c*, hypopygium.

Fig. 10. *Paracleius solivagus*, n. sp.; *a*, head, front view; *b*, head, side view; *c*, hypopygium.

Fig. 11. *Tachytrechus seychellensis*, n. sp.; *a*, head, front view; *b*, antenna (line represents 0·5 mm.); *c*, hypopygium.

Fig. 12. *Argyrochlamys impudicus*, n. sp.; *a*, head, front view; *b*, head, side view; *c*, hypopygium; *d*, extruded genitalia, female.

Fig. 13. *Urodolichus porphyropoidès*, n, sp.; *a*, head, front view, male; *b*, head, front view, female; *c*, head, side view, male; *d*, hypopygium; *e*, diagrammatical representation of end of male abdomen.

Fig. 14. *Urodolichus caudatus*, n. sp., hypopygium; *a*, ventral view; *b*, side view.

Fig. 15. *Urodolichus gracilis*, n. sp., hypopygium; *a*, ventral view; *b*, side view.

Plate 29.

Fig. 16. *Craterophorus mirus*, n. sp.; *a*, head, front view; *b*, dorsal view of thorax and first three abdominal segments; *c*, hypopygium. Line in *b* and *c* represents 0·5 mm.

Fig. 17. *Craterophorus mirabilis*, n. sp.; antenna. Line represents 0·2 mm.

Fig. 18. *Cryptophleps ochrihalteratus*, n. sp.; *a*, head, front view; *b*, head, side view. Line in both represents 0·5 mm.

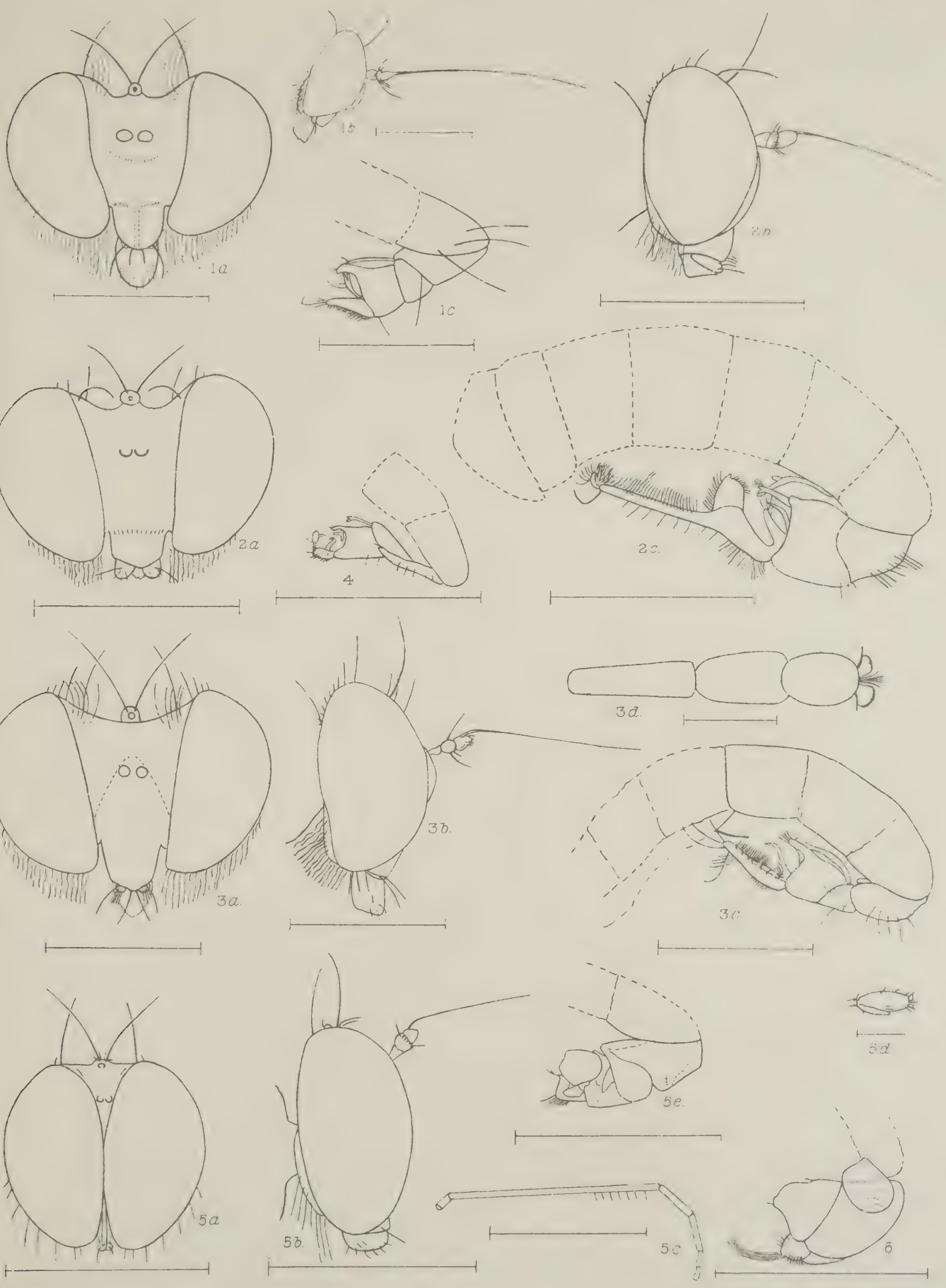
Fig. 19. *Acropsilus errabundus*, n. sp.; hypopygium.

Fig. 20. *Sympycnus violaceus*, n. sp.; apex of hind tibia and basal segment of tarsus. Line represents 0·2 mm.

Figs. 21—27. Wings of: 21, *Asilid*, genus and species ?, × 6. 22, *Scenopinus balteatus*, n. sp., × 30 23, *Psilopus leucopogon*, Wied., × 7. 24, *Psilopus lasiophthalmus*, n. sp., × 15. 25, *Psilopus bilobatus* n. sp., × 13. 26, *Psilopus librativertex*, n. sp., × 25. 27, *Psilopus pollicifer*, n. sp. × 15.

PLATE 30.

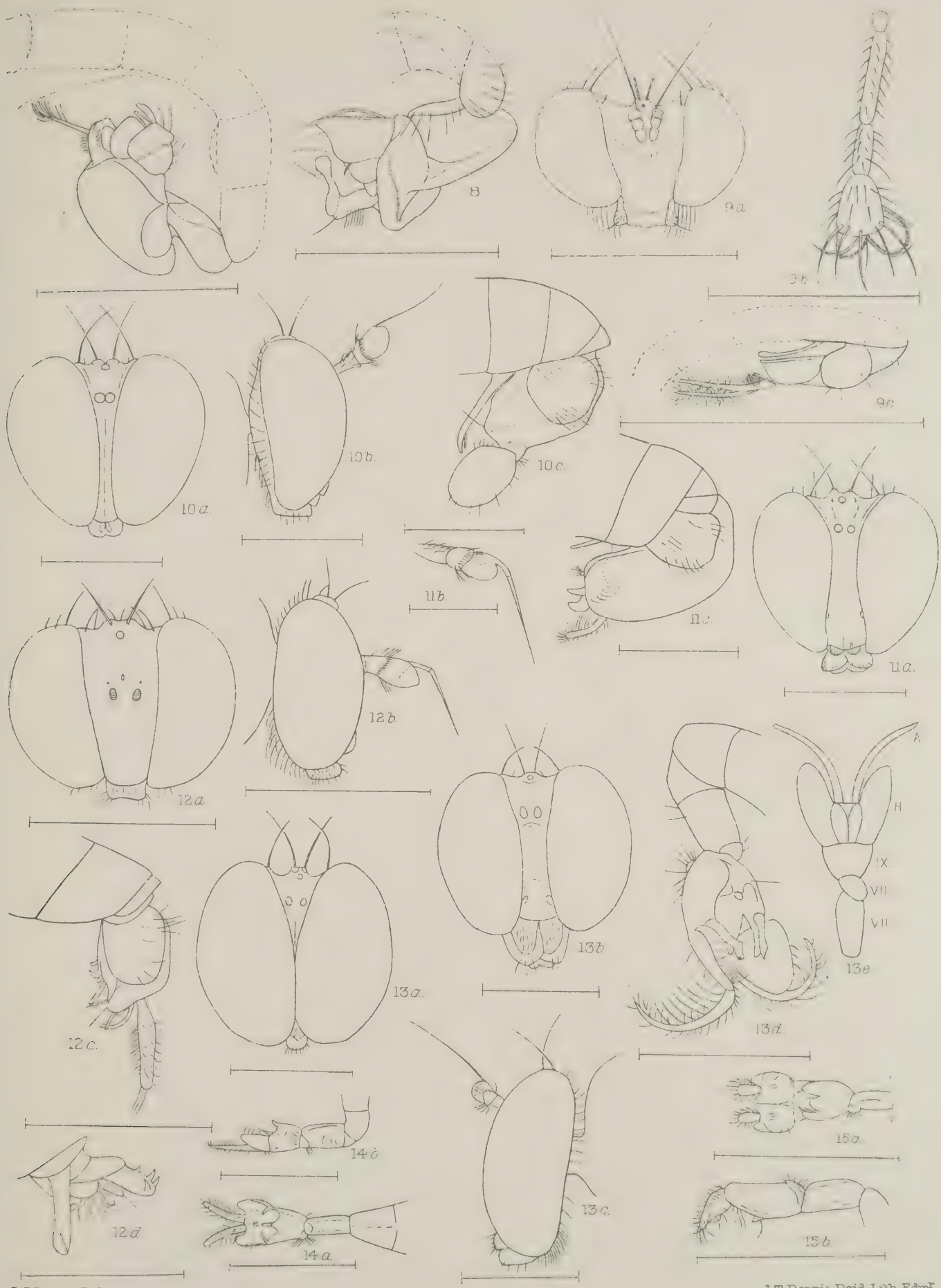
Figs. 28—47. Wings of: 28, *Psilopus grandicaudatus*, n. sp., × 20. 29, *Craterophorus mirus*, n. sp.; *a*, female; *b*, male; × 30. 30, *Craterophorus permirus*, n. sp.; male, × 20. 31, *Neurogona angulata*, de Meijere, × 15. 32, *Paracleius solivagus*, n. sp., × 17. 33, *Tachytrechus seychellensis*, n. sp., × 15. 34, *Argyrochlamys impudicus*, n. sp., × 20. 35, *Urodolichus porphyropoides*, n. sp., × 15. 36, *Urodolichus caudatus*, n. sp., × 18. 37, *Chrysotus seychellensis*, n. sp., × 30. 38, *Cryptophleps ochrihalteratus*, n. sp., × 35. 39, *Cryptophleps nigrihalteratus*, n. sp., × 25. 40, *Acropsilus errabundus*, n. sp., × 30. 41, *Sympycnus violaceus*, n. sp., × 40. 42, *Medeterus grisescens*, de Meijere, × 22. 43, *Pipunculus*, sp.?, × 10. 44, *Pipunculus semiopacus*, n. sp., × 14. 45, *Pipunculus depauperatus*, n. sp., × 18. 46, *Pipunculus confusoides*, n. sp., × 20. 47, *Pipunculus sylvaticoides*, n. sp., × 25.



C. G. Lamb, Del.

J. T. Rennie Reid, Lith. Edin.

DOLICHOPODIDÆ.



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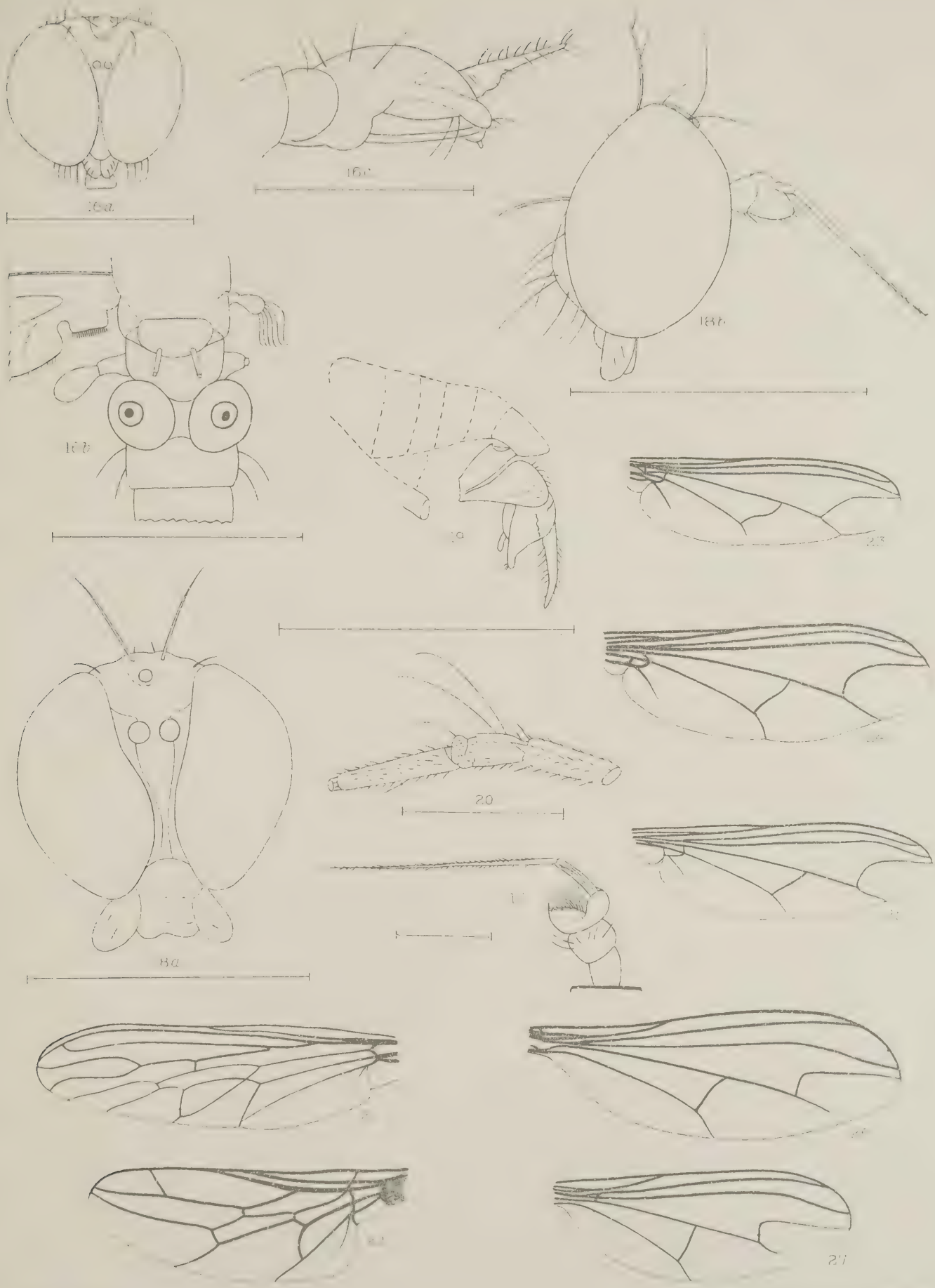

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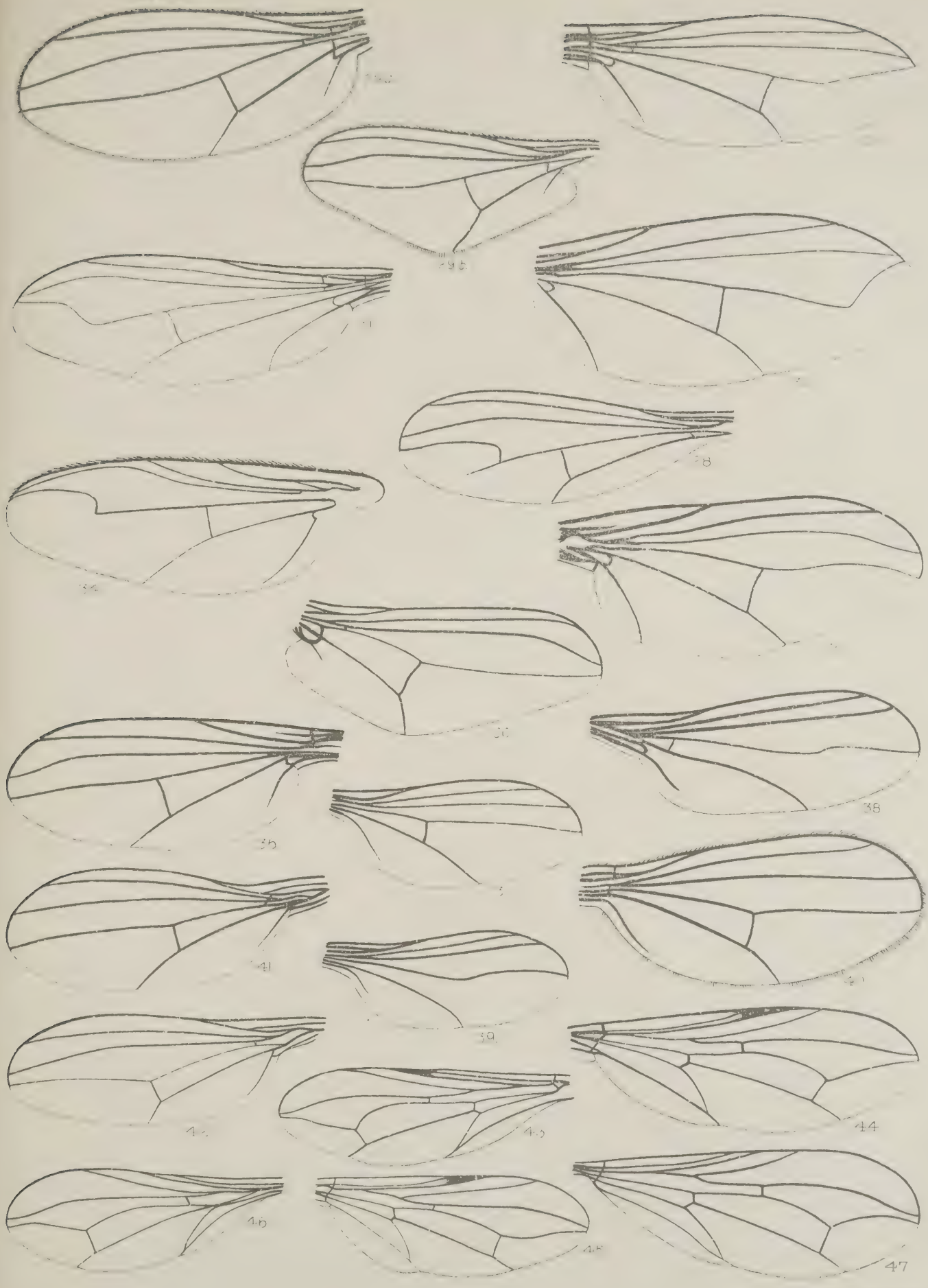
J. T. Rennie Reid. Lith. Edin.r

ASILIDÆ, SCENOPINIDÆ, DOLICHOPODIDÆ



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DOLICHOPODIDÆ, PIPUNCULIDÆ.

No. IX.—MADREPORARIA: AGARICIIDÆ.

By Dr C. J. van der Horst.

(Communicated by J. Stanley Gardiner, M.A., F.R.S., F.L.S.)

(With Plates **31** and **32**, and Text Figures 1 and 2.)

Read 5th *May*, 1921.

INTRODUCTION.

When Prof. Gardiner asked me to identify the corals belonging to the family *Agariciidæ*, collected by the Percy Sladen Trust Expedition, I gladly accepted his offer, as it was an opportunity for comparing the corals from the Red Sea and the western part of the Indian Ocean with those collected by the Siboga Expedition in the Indo-Australian Archipelago. I hoped also to acquaint myself with several species, which are not represented in the collections of the Museum at Amsterdam.

I was greatly surprised and pleased, when I unpacked the collection, to find not only those of the Percy Sladen Trust Expedition and those collected by the late Mr F. P. Bedford and by Mr C. Crossland, but also specimens from the Maldives, previously described by Prof. Gardiner. Everybody, acquainted with corals, knows that these specimens were of great use. I found provisional determinations made by Prof. Gardiner on most of the labels. These annotations facilitated my study, although I did not always agree with him as in the case of *Pavona clavus*. There was also some diversity between Prof. Gardiner and me concerning *Psammocora planipora* and *Psammocora haimeana*, but this gives support to my observations on the relationship between these two species.

Although the coral-fauna of the Red Sea and the western part of the Indian Ocean had been studied by many previous authors (Ehrenberg, Klunzinger, Ortmann, Gardiner, von Marenzeller, Vaughan, Gravier, etc.), I found my re-examination at least useful to myself. It is not always an easy task to recognise a species from a description. Moreover the variation in one coral-species is often so great that different forms of one species have frequently been described as different species. In a collection consisting of a large number of specimens it is nearly always possible to recognise different previously described species as belonging to one and the same species, being only varieties of that species connected by transitional forms. It is a remarkable fact that the number of known species of corals has decreased considerably in the last 20 years, notwithstanding numerous species described as new. While describing here three new species, I absorb more; and I only wonder, what will be the ultimate fate of my species.

AGARICIIDÆ.

1. *Agaricia ponderosa* Gardiner 1905 ; Vaughan 1918.

The four specimens I have before me are all typical according to Gardiner's description and figures. They comprise Gardiner's Maldive specimens and a colony from Salomon Atoll, Chagos Archipelago.

2. *Pavona venusta* Dana 1846 ; Verrill 1864 ; Vaughan 1918. (Plate **31**, figs. 1, 2.)

Leptoseris venusta Brüggemann 1878.

Six colonies closely agree with the descriptions of Dana and Vaughan. One small colony from the Seychelles is somewhat doubtful. The septa are strongly alternating in size, while in *P. prætorta*, which otherwise closely resembles *P. venusta*, they are equal ; another difference may be that the lobes in *P. venusta* are somewhat thicker.

Loc. Seychelles, 3 spec. ; Donganab, Red Sea, four colonies.

3. *Pavona prætorta* Dana 1846 ; Verrill 1864 ; Quelch 1886 ; van der Horst 1921.

Lophoseris prætorta Ortmann 1888.

One colony of this species was collected at the Seychelles.

4. *Pavona decussata* Dana 1846 ; Quelch 1886 ; Bedot 1907 ; van der Horst 1921.

Pavona angularis Klunzinger 1879 ; v. Marenzeller 1906 ; Gravier 1911.

Pavona cristata Gardiner 1898.

This species is characterised by the rather thick and broad lobes, thicker and broader than in the nearly related *P. danai*. The ambulacra are flat. The carinæ are poorly developed or quite absent. The septo-costæ are alternating in size.

Loc. Donganab, Red Sea, 2*.

5. *Pavona explanulata* (Lam.) ; Klunzinger 1879 ; Ridley 1888 ; Whitelegge 1898. (Plate **31**, fig. 9.)

Agaricia explanulata Lamarck 1816 and 1836.

Lophoseris explanulata Milne-Edwards 1860 ; Ortmann 1889.

The four specimens I have before me agree with the descriptions and figures of Milne-Edwards and Klunzinger. As may be seen from the synopsis given by Vaughan in 1918 this species is nearly related to *P. diffluens* (Lam.). Still the two species can be distinguished easily by the following characters : in *P. explanulata* the columella is generally well developed in the form of a rod-like or compressed style, while *P. diffluens* has hardly any or no columella ; the diameter of the calices is 3 to 4 mm. in *P. explanulata*, and 3 mm. in *P. diffluens*, while the diameters of their centra are respectively 2 mm. and 1 mm. at most. The septo-costæ are in *P. explanulata* generally alternating in size, but not as strongly as in *P. diffluens*, sometimes being even equal in size. The under side of *P. explanulata*, as far as it could be seen, was marked by fine ribs.

In his synopsis Vaughan gives as his opinion that *P. duerdeni* Vaughan, *Siderastrea maldivensis* Gardiner, and *Pavonia clavus* Dana are probably synonyms of *P. explanulata*.

* The numbers refer throughout to the numbers of specimens from each locality.

This is certainly not correct since the calicles in *P. explanulata* and even in *P. diffluens* are far larger than in the above mentioned species. The difference between the three species *P. clavus* Dana, *P. diffluens* (Lam.) and *P. explanulata* (Lam.) may be seen by comparison of the three figures (Plate **31**, figs. 7, 8, 9).

Loc. Salomon, Chagos, 4 spec.

6. *Pavona divaricata* Lamarck 1816; Dana 1846; Brüggemann 1879; Quelch 1886; Gardiner 1898; van der Horst 1921.

Lophoseris divaricata Milne-Edwards 1860; Ortmann 1888 and 1889.

The only specimen deviates somewhat from the specimens of the same species in the Museum at Amsterdam, described by me in my Siboga Report. The branches in this specimen are more crowded together, thicker and sharper keeled. The specimens in Amsterdam more nearly resemble in this respect *P. seriata* Brüggemann, but they have the calicles larger and the septo-costæ alternating in size, resembling those of *P. danai*; in this specimen the septo-costæ are more crowded as in *P. decussata*, and they are not alternating in size everywhere. Notwithstanding these differences I cannot come to another conclusion, neither according to the description of Dana and Milne-Edwards nor according to Vaughan's synopsis, than that all specimens that I have examined belong to the species *P. divaricata*. Prof. Gardiner also sent me the specimens he collected at Wakaya, Fiji and Rotuma which he described in 1898. These specimens resemble more closely those at Amsterdam in respect to the septo-costæ.

Loc. Singapore.

7. *Pavona varians* Verrill 1864; Vaughan 1907 and 1908; van der Horst 1921. (Plate **31**, figs. 3, 4.)

Lophoseris repens Brüggemann 1877; Ortmann 1888 and 1889.

Pavona repens Klunzinger 1879; Whitelegge 1898; Gardiner 1898 and 1905.

Pavona percarinata Ridley 1883.

Pavona intermedia and *calicifera* Gardiner 1898.

Most of the numerous specimens of this species are typical *P. varians*. Only four of them are remarkable: no. 1 from Donganab, Red Sea; no. 2 from Singapore; no. 3 from Port Sudan and no. 4 one of the specimens from Salomon.

No. 4 is undoubtedly a *P. varians*, but some of the cristæ are very elevated (to 1 cm.), one of them being nearly 2 cm. high, and have on their sides a few calicles. All cristæ in the whole colony are somewhat higher and shorter than is usual; sometimes they are even prominent cones. The condition is similar in no. 3. Some of the high cristæ give the impression of the short branches of *P. divaricata*. No. 2 also somewhat resembles *P. divaricata* and has high leaf-shaped cristæ.

In no. 1 the cristæ are most developed, being sometimes 3—4 cm. high. Generally they have the form of branching leaves attached by a round stalk on the large incrusting base, which undoubtedly belongs to *P. varians*. Some of the cristæ have the form of triangular or quadrangular columns. This specimen agrees in all respects with Ridley's description of his *P. percarinata*. If no. 4 was not so clearly a transitional form, I should not have looked upon the specimen from Donganab (no. 1) as belonging to *P. varians*.

Concerning the relationship between *P. varians* and *P. percarinata* Ridley says: "*P. repens* Brüggemann, is also nearly allied, but wants the very sharp superior carinæ and the strong tendency to form lobose projections." The septa and the columella are in all respects the same as in the ordinary *P. varians.*

Loc. Donganab, 1, and Port Sudan, 1, both Red Sea ; near outer edge of reef, Raffles Lighthouse, Singapore ; Minikoi, 1 ; Miladumudulu, 1, and Hulule, Male, 1, both Maldives ; Salomon, 10, Peros Banhos, 1, and Egmont, 1, all Chagos ; Saya de Malha, 1 ; Amirantes, 1 ; and three specimens from unknown localities.

8. *Pavona gardineri* nov. spec. (Plate **31**, figs. 5, 6.)

The following is a description of the type specimen : Corallum forming a thin plate, at most 2 mm. thick, irregularly folded and attached only over a small part of the under surface. Unifacial. Septo-costæ parallel to each other in small groups, but the groups themselves going in different directions, which are not being influenced by the position of the calicles. Only, in the immediate neighbourhood of the calicles, those septo-costæ, which are nearest to the calices, bend at sharp or right angles to form the short septa. Towards the centrum the septa are somewhat higher and the principal septa also thicker. Number of septa at most 24, generally less. Columella well developed as a rather thick, somewhat compressed style. Ambulacra flat. Septo-costæ in some parts of the colony obviously alternating in size, in other parts nearly equal in size. Carinæ absent. Lower surface very finely costate.

Loc. One specimen from Saya de Malha, 29 fms.

9. *Pavona clavus* Dana 1846 ; von Marenzeller 1901. (Plate **31**, fig. 7.)

Lophoseris clavus Milne-Edwards 1860.
Siderastrea clavus Verrill 1864 ; Gardiner 1898.
Siderastrea sphæroidalis Ortmann 1889.
Siderastrea savignyana Ortmann 1891.
Tichoseris clavus Rehberg 1892.
Siderastrea clava, lilacea, maldivensis and *sphæroidalis* Gardiner 1905.
Pavona duerdeni Vaughan 1907.
Pavona maldivensis Vaughan 1918.

Vaughan gives as his opinion in his Synopsis of 1918 that *P. clavus* Dana, *P. duerdeni* Vaughan and *P. maldivensis* Gardiner are probably synonyms of *P. explanulata* (Lam.). That they are not synonyms of *P. explanulata* (Lam.) I have pointed out under that species. But that they are synonyms of each other is in my opinion not only probable but certain. Gardiner labelled the corals, he sent me, temporarily a *Siderastrea clavus, S. lilacea* and *S. sphæroidalis,* but I cannot find any difference that gives the right to specific separation. *S. sphæroidalis* Ortmann does not exist as that author in 1891 corrected himself, stating that *S. sphæroidalis,* described by him in 1889, was synonymous with *S. savignyana* Klunzinger. However he made a second mistake in that *Siderastrea savignyana* Ortmann is something other than the species described by Klunzinger ; the latter is the only Indo-Pacific species of *Siderastrea* previously known as will be seen later on. Gardiner's *S. lilacea* also is not the same as *S. lilacea* of Klunzinger, the former

being a *Pavona* the latter a true *Siderastrea*, but synonymous with *S. savignyana*. I have not seen *P. duerdeni* Vaughan, but judging from his description and figure, I think it must also be placed in the synonymy of *P. clavus* Dana. That this species is not a *Siderastrea* but a *Pavona* is pointed out clearly by von Marenzeller in 1901 and by Vaughan in 1907.

I do not think a new description is necessary as the species is sufficiently described and figured by Dana, Gardiner and other authors, under different names.

Loc. Seychelles, 2 spec.; Salomon, 5 and Egmont, 2, both Chagos.

10. *Podabacia crustacea* (Pallas); Milne Edwards 1860; Verrill 1864; Studer 1877; Ortmann 1888 and 1889; Gardiner 1905; Bedot 1907; van der Horst 1921.

Madrepora crustacea Pallas 1776.

Madrepora pileus Esper 1791.

Pavona explanulata Dana 1846.

Halomitra crustacea Duncan 1883.

Halomitra (*Podabacia*) *crustacea* Duncan 1886; Studer 1901.

I am able to confirm Gardiner's identification of this species from a re-examination of some of his specimens from Minikoi.

11. *Leptoseris papyracea* (Dana); Verrill 1864; van der Horst 1921.

Pavona papyracea Dana 1846; Bassett-Smith 1890.

Loc. Amirante, 30 fms., 19; Amirante, 39 fms., 1; Amirante, 40—60 fms., 1; Amirante, 20—25 fms., 1. All clearly belong to this species.

12. *Leptoseris hawaiiensis* Vaughan 1907; van der Horst 1921. (Plate **32**, fig. 1.)

The corallum of the two specimens I have before me is a little thicker than in the specimens collected by the Siboga Expedition. A further difference is that the columella in the Siboga specimens is typical according to Vaughan's description, while in these two specimens the columella is slightly developed and has the form of an irregular mass. However, that is not sufficient reason for specific separation from the Siboga specimens. All the specimens that I have examined differ from Vaughan's description in having the septo-costæ rather strongly alternating, while Vaughan says the septo-costæ are equal or slightly alternating, adding that the species is very variable.

Loc. Amirante, deeper than 20 fms., 2.

13. *Leptoseris scabra* Vaughan 1907.

I have identified four specimens as belonging to this species. There is one young specimen from Amirante with a diameter of 4 cm., one from Cargados, 30 fms., with a diameter of 7 cm., and two broken specimens from Providence, 50—78 fms., with a least diameter of 20 cm.

The corallum of this species is thicker than that of *L. hawaiiensis*, increasing to 1 cm. In the two young specimens the central calicle is obvious, but in the two larger ones it is not to be seen. The septo-costæ are somewhat rougher than in *L. hawaiiensis*, but the difference is not as obvious as indicated in Vaughan's description. The septo-costæ show numerous perforations, whereas those of *L. hawaiiensis* are imperforate, exactly as described by Vaughan. According to the latter the septo-costæ usually are distinctly alternating in size, while in my specimens their alternation is much less distinct.

14. *Leptoseris tubulifera* Vaughan 1907; van der Horst 1921.

The only specimen that I refer to this species is very much like *L. incrustans* Gard. Except for the formation of tubes, the only difference is that *L. incrustans* is attached over the whole of the under surface, while this species is attached only in the centre. The colony consists of an irregular plate with two tubes near the periphery and one arborescent tube in the centre, but I am somewhat in doubt if the formation of tubes is to be looked upon as a good specific character. I have also before me an irregularly formed but otherwise indubitable specimen of *L. fragilis* that has formed a few tubes along the edge.

Loc. Amirante, deeper than 25 fms., 1.

15. *Leptoseris fragilis* Milne-Edwards et Haime 1849; Milne-Edwards 1860; Gardiner 1905; van der Horst 1921.

The greater part of the specimens are young ones with only a central calicle.

Loc. Amirante, deeper than 20 fms., 2; Amirante, 30 fms., 16.

16. *Leptoseris gravieri* nov. nomen.

Leptoseris incrustans Gardiner 1905; van der Horst 1921.

An Amirante specimen is incrusting on a very irregular base, the corallum accordingly being irregular. To this irregularity is due the formation of a few tubes which are quite similar to those of *L. tubulifera*. Nevertheless I refer this specimen to *L. incrustans* Gard., as it is attached over the whole of its under surface, as far as that is possible on an irregular base. As Quelch's *Cylloseris* (now *Leptoseris*) *incrustans* has the priority I have to rename this species.

Loc. Amirante, deeper than 25 fms., 1; Saya de Malha, 29 fms., 3.

17. *Leptoseris tenuis* van der Horst 1921.

The three specimens which I compared with the type are all typical. The only difference from the specimen collected by the Siboga is that it possesses slightly rounded ridges. In two specimens the ridges are not equally developed over the whole surface of the corallum, being in some parts nearly invisible. In the Saya de Malha specimen the ridges are sharper and higher, the calicles being situated in the valleys. The surface of the specimen of the Siboga Expedition is quite flat.

Loc. Providence, 50—78 fms., 3; Amirante, 1; Saya de Malha, 26 fms., 1.

18. *Leptoseris incrustans* (Quelch). (Plate **32**, figs. 3, 4.)

Cylloseris incrustans Quelch 1886.

I have no doubt in referring two specimens from Peros Banhos to this species. The only difference from the original description is that not all the calicles are as small as Quelch says. The older calicles, situated on the bottom of the valleys, are larger, the central opening increasing to 1 mm.

The other specimens deviate somewhat from Quelch's description, but the calicles are larger. The columella is not always "well developed, rather compressed and tuberculate," in some calicles having this form, in others being trabeculate. The distance between the septo-costæ is wider in the specimens from Saya de Malha than in those from Peros Banhos, the septo-costæ being easily seen with the naked eye. This gives them a strikingly different

appearance at first sight, but in some parts of the two typical specimens the septo-costæ can also be seen with ease. I do not, however, consider that the above differences warrant the description of the Saya de Malha specimens as a new species.

There is a striking resemblance between these specimens and von Marenzeller's figure of *Coscinaræa monile*, as may be seen by comparison of the figures. My specimens belong without any doubt to the genus *Leptoseris*.

Loc. Peros Banhos, Chagos, 15—16 fms., 2; Saya de Malha, 26 fms., 1; Saya de Malha, 29 fms., 7; Providence, 29 fms., 1.

19. *Leptoseris solida* (Quelch).

Domoseris solida Quelch 1886.

I agree with Gardiner in including Quelch's *Domoseris* in the genus *Leptoseris*. I have before me one specimen, an indubitable *Leptoseris*, in which I think I can recognize the *Domoseris solida* of Quelch. The septa are solid, but they are not so strikingly unequal as might be concluded from Quelch's description—not from his enlarged figure. For the rest it agrees in all respects with Quelch's description; only my specimen is not shallow-vasiform, but exactly the reverse, the upper side convex, scarcely a difference of great importance.

Loc. Providence, 50—78 fms., 1.

20. *Siderastrea savignyana* Milne-Edwards et Haime 1850; Klunzinger 1879; Vaughan 1907*a*; Gravier 1911; van der Horst 1921. (Plate **31**, fig. 10; Plate **32**, fig. 2.)

Astræa savignyana Milne-Edwards et Haime 1857.

Siderastrea lilacea Klunzinger 1879.

Siderastrea savignyi Rehberg 1892.

Klunzinger gave excellent descriptions of his two species, *S. savignyana* and *S. lilacea*, stating that they can easily be separated. Nevertheless, I think that both species are synonymous. In one and the same specimen some parts have the shallow calicles of *S. savignyana* (Plate **31**, fig. 10), while other parts have the deeper calicles of *S. lilacea* (Plate **32**, fig. 2). Different parts of the same colony agree in every respect with Klunzinger's description of each species, this remark also applying to the columella and the form of the septa, as may be seen by comparing the two figures.

The specimen, collected by the Siboga Expedition, is a thin incrusting plate and a typical *S. savignyana* with shallow calicles. Three of the specimens, which I have before me in the present collection, are thick and massive. The fourth one, agreeing in the form of the calicles and of the columella with Klunzinger's *S. lilacea*, is a thin plate, this being a typical character of *S. savignyana**.

Loc. Donganab, Red Sea, 4.

21. *Coscinaræa monile* (Forskål); Klunzinger 1879; Duncan 1886; Ortmann 1888 and 1891; Gardiner 1905; von Marenzeller 1906; Vaughan 1907*a*; Gravier 1911.

Madrepora monile Forskål 1775.

Astræa mæandrina Ehrenberg 1832.

Coscinaræa mæandrina Milne-Edwards 1860; Duncan 1886.

* Concerning Ortmann's *S. savignyana* and Gardiner's *S. lilacea* see under *Pavona clavus*.

All specimens agree in every respect with the descriptions and figures given by Klunzinger and Vaughan, but they deviate from the figure given by von Marenzeller. The latter saw the type specimen, but I cannot find a description nor a figure of the type in his paper, though Vaughan says that von Marenzeller gives them.

Von Marenzeller figures another, a young specimen, and that figure shows a striking resemblance to my *Leptoseris incrustans* (Quelch) as I have said before. He says nothing about the septa. The septa in *Leptoseris* have a smooth edge without teeth; *Coscinaræa* has teeth on the edge of the septa according to Klunzinger and Vaughan, and these teeth can readily be seen both in the latter's figure and in my specimens. Duncan also mentions them in his paper of 1883. My specimens of *Leptoseris incrustans* (Quelch) are not young specimens of *Coscinaræa monile*. If the specimen, figured by von Marenzeller, is really the same as the type specimen and also the same as my *Leptoseris incrustans* (Quelch)—and I think it is—then we have to maintain Ehrenberg's name *C. mæandrina* for nearly all the specimens described under the name *C. monile* by different authors, and *Leptoseris incrustans* (Quelch) should be *Leptoseris monile* (Forskål).

One specimen of Port Sudan has scarcely any collines; it seems to be a young specimen (diameter 8 cm.). I identify the three specimens of Saya de Malha as very young specimens of *C. monile*. They have a diameter of 1 cm. The septa and columella have the typical form. There is only a central calicle but new calicles are exactly on the point of forming. The corallum is rather convex.

Loc. Donganab, Red Sea, 4; Port Sudan, Red Sea, 2; Cargados, 25 fms., 1; Saya de Malha, 150 fms., 3.

22. *Coscinaræa ostreæformis* nov. spec. (Plate **32**, figs. 5, 6 and figs. 1, 2.)

Corallum forming a flat plate. The living part does not exceed 1 mm. in thickness and has grown repeatedly over the dead part, passing every time a little beyond its edge. In that way a corallum has formed, attached only in the centre, being there about 5 cm. thick, the edge of course being only 1 mm. thick. The mode of growth is clearly visible, especially on the under side, in the concentric rings, which give the corallum the appearance of an oyster shell, with the difference that the concentric rings are visible only on the flat under side and not on the convex upper side of the corallum.

The ribs are well developed on the under side. At the edge of every ring there is only a slight difference between the alternating costæ; they all are very low lamellæ. At a distance of about 1 cm. from the edge the secondary ribs disappear gradually and the principal ribs grow more prominent; where the secondary ribs have disappeared altogether the principal ones are separated by flat spaces. There are about 18 principal costæ in 1 cm. They have a smooth edge, without spines or granulations.

The calices on the upper side are sunken in for ·5 mm. at most, but usually they are not at all depressed. They are irregularly scattered over the whole upper side except at the edge of the corallum, where they are situated in a row parallel to the edge. The distance between the calicular centra is 4 to 5 mm. The opening of the calicle is at most 1 mm. wide. The septa are of the same form as in *Coscinaræa monile*, with irregular, rough, finely arborescent teeth at the edge. Columella trabeculate or totally absent.

Loc. Providence, 50—78 fms., 2; Providence, 29 fms., 1.

Figs. 1, 2. *Coscinaræa ostreæformis* nov. spec. Upper and under surfaces, × about $\frac{2}{3}$.

23. *Psammocora exesa* Dana 1846; Milne-Edwards 1860; Brüggemann 1879; Quelch 1886; Rehberg 1892; Gardiner 1905; van der Horst 1921.

I have four specimens before me, one from Seychelles, one from Goidu, one from Hulule, Maldives and one from an unknown locality. They are all typical, but the one from Seychelles, a fine big colony, has not the typical cylindrical lobes, its two big lobes being flattened and having the shape of a crest.

24. *Psammocora contigua* (Esper); Milne-Edwards 1860; Ortmann 1888; Gardiner 1898 and 1905; Whitelegge 1908; van der Horst 1921.

Madrepora contigua Esper 1797.

Psammocora plicata Dana 1846.

I have before me a great many specimens belonging to this species. Typical representatives were collected at the following localities: Singapore, Blehany Waty, south side, water muddy, reef irregular; Raffles Lighthouse, Singapore, reef proper (common also between reef and shore) and Singapore, all collected by Mr Bedford; Goidu, Hulule and Mahé reefs, Maldives.

I also examined three specimens—two from Goidu and one from Minikoi—belonging to the var. *maldivensis* Gardiner. The difference between this variety and the typical form is a very slight one, as Gardiner also says; nevertheless the variety is recognisable.

25. *Psammocora planipora* Milne-Edwards et Haime 1851; Milne-Edwards 1860; Klunzinger 1879; Ortmann 1888 and 1889; Bassett-Smith 1890; von Marenzeller 1906; van der Horst 1921.

Psammocora gonagra Klunzinger 1879; Vaughan 1918.

It was sometimes difficult to me to separate this species from *Ps. haimeana*. In the typical form both species are quite distinct; *Ps. haimeana* is incrusting and flat, the calicles deeply sunken and separated by sharp ridges, while *Ps. planipora* has thick angular lobes on an incrusting base, the calicles not sunken and not separated by ridges. There is no difference in the number of septa nor in the form of the columella.

Notwithstanding that the typical forms can easily be distinguished, I have among the numerous specimens several in which the angular lobes are only slightly developed and hardly prominent above the incrusting base. The angular edges of the lobes may extend over the base forming ridges between the calicles. We thus have specimens which are very much like *Ps. haimeana*, especially when the calicles are somewhat sunken.

Two specimens from Donganab are thin, incrusting plates on which the relatively short lobes are typical for the species. The septa are thinner than in the other specimens, so that the interseptal loculi are wider. Hence the septa and septo-costæ are rather easily visible to the naked eye, a feature not always possible.

Loc. Saya de Malha, 29 fms., 15, and 26 fms., several; Salomon, Chagos, 2; Minikoi, 1; Donganab, Red Sea, 2.

26. *Psammocora haimeana* Rousseau; Klunzinger 1879; Ortmann 1888; Bassett-Smith 1890; Gardiner 1905; van der Horst 1921.

Psammocora haimeana Milne-Edwards 1860; Gardiner 1898; Vaughan 1918.

Loc. Donganab, Red Sea, 1; Salomon, 9, and Egmont, 1, both Chagos; Minikoi, 3; Haddumati, 1, Goidu, 2, Addu, 1, Hulule, Malé, 2, and locality uncertain, 1, all Maldives. All these are typical specimens, according to Klunzinger's excellent description.

27. *Psammocora explanulata* nov. spec. (Plate **32**, figs. 7, 8.)

Corallum incrusting and thin. The thickest part of the colony is 8 mm., but here the corallum is dead and covered again by a living layer. For the rest the maximum thickness is 3 mm., but is ordinarily less. The surface of the corallum is smooth, without protuberances or crests. The calicles are sunken just a little in the centre. They are large and easily visible, with clearly radiating septa. Number of septa 12 to 18, the principal ones often thickened. The columella is well developed, consisting of several papillæ. The calicles are irregularly scattered; the distance between the calicular centra is 2—4 mm., at the edge of the corallum often more. The edge of the septa and septo-costæ is densely covered with small, rough, often arborescent teeth. The coenenchym is richly developed.

The separate septo-costæ, as well as the septa, are clear to the naked eye, in the same way as in *Ps. exesa*. Generally they are parallel to each other, united in groups, and connected also by parallel rows of synapticula. The groups of septo-costæ are not parallel to each other; extending in different directions, quite independently of the direction of the septa in the calicles; septa and septo-costæ may join at the periphery of the calicles at any angle.

In some parts of the corallum thinner septo-costæ form a network, surrounding short and thick ones, exactly as in other species of *Psammocora* (e.g. *Ps. contigua*) and in

Polyphyllia. Also in the groups of longer, parallel septo-costæ smaller sometimes alternate, but not always.

Loc. Providence, 50 to 78 fms., 4; Providence, 29 fms., 1; Amirante, 2.

28. *Pachyseris levicollis* (Dana); Milne-Edwards 1860; Bassett-Smith 1890; van der Horst 1921.

Agaricia levicollis Dana 1846.

Pachyseris laevicollis Ortmann 1888; Gardiner 1905.

According to Dana the only characteristic difference between *P. levicollis* and *P. speciosa* is the nature of the ridges. In *P. levicollis* they are elongate, nearly obsolete and narrow, while in *P. speciosa* they are prominent, narrow, subtriangular, nearly even. However, the height of the ridges in *P. levicollis* is very variable in the same colony, as seen in a large colony from Saya de Malha; at the same time the ridges in *P. speciosa* are always higher and sharper than in *P. levicollis*. The specimen from Salomon is remarkable for the presence of a well developed columella, exactly in the same form as in Vaughan's *P. torresiana*.

Loc. Saya de Malha, 29 fms., 1; Amirante, 2, and 40—60 fms., 1; Cargados, 30 fms., 1; Salomon, Chagos, 1; Donganab, Red Sea, 1; Suvadiva, Maldives, 26—27 fms., 1.

29. *Pachyseris valenciennesi* Milne-Edwards et Haime 1851; Milne-Edwards 1860; Ortmann 1888 and 1899; van der Horst 1921.

Agaricia rugosa Dana 1846.

Pachyseris monticulosa Verrill 1875; Studer 1901.

A small piece of a *Pachyseris* collected by Mr Bedford at Singapore has the short and irregular ridges of *P. valenciennesi*, but not as high as normal. The piece is too small for any certainty as to its identity, but I think it is *P. valenciennesi*.

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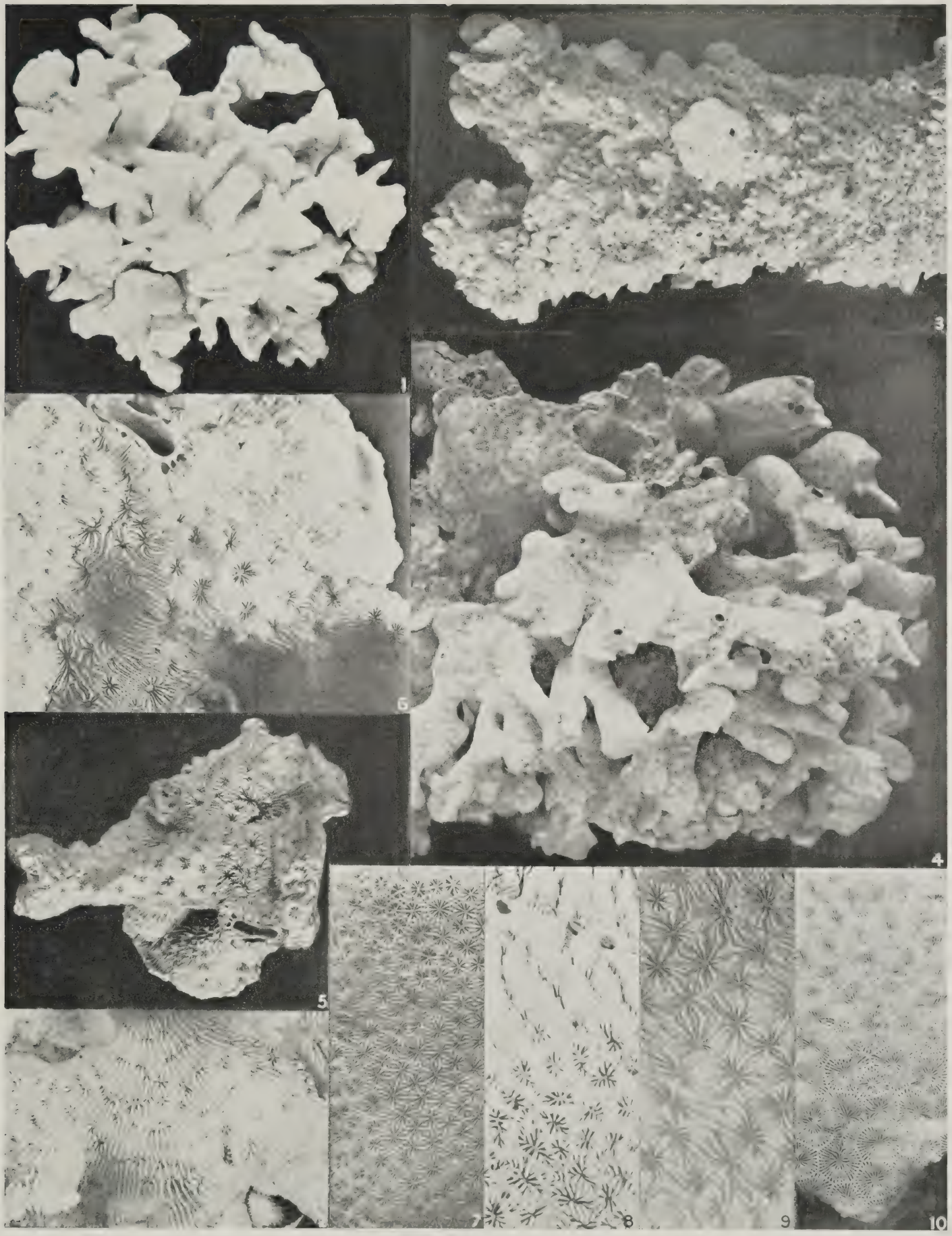
EXPLANATION OF PLATES

PLATE 31.

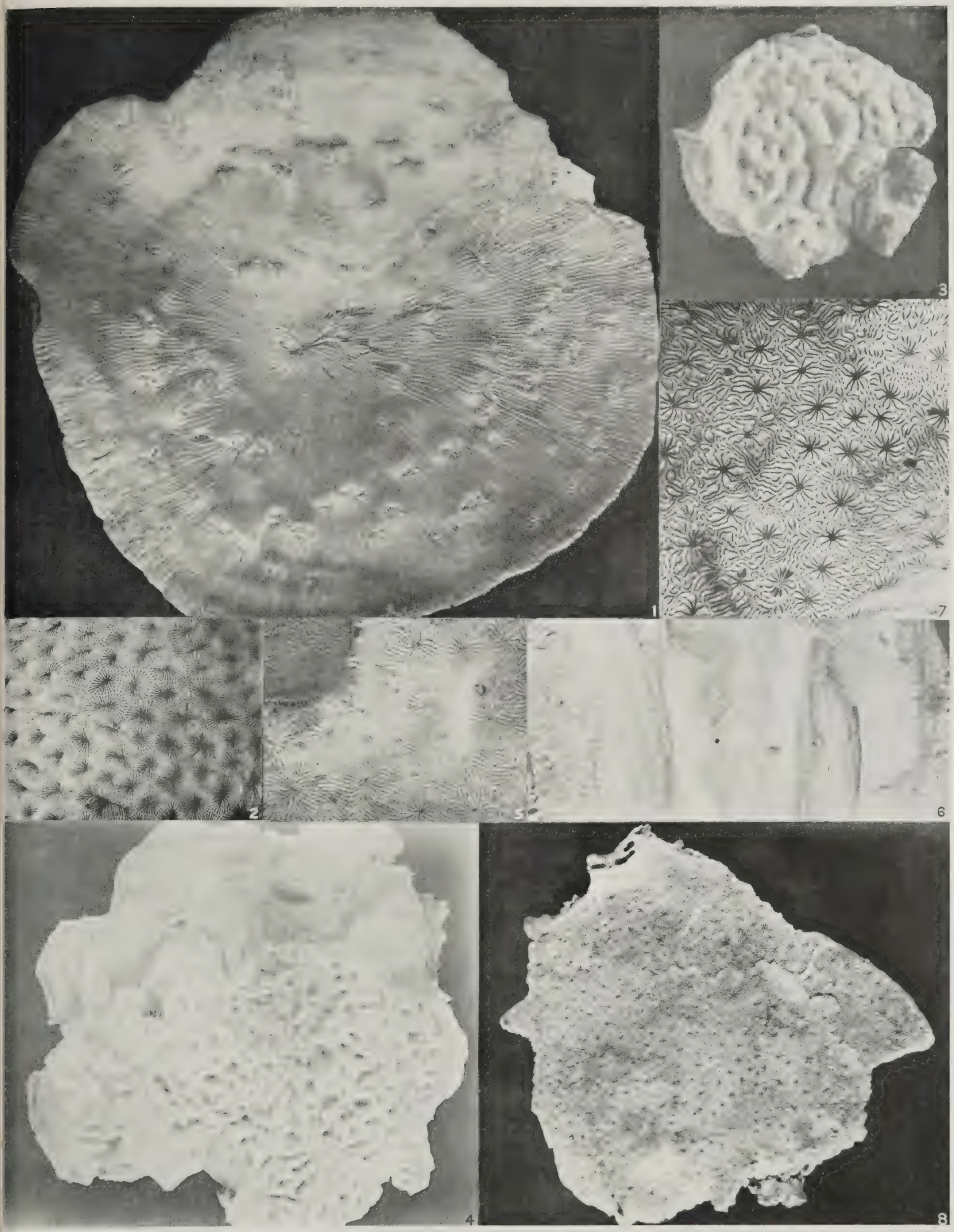
Fig. 1. *Pavona venusta* Dana. Nat. size.
Fig. 2. *Pavona venusta* Dana. × 2½.
Fig. 3. *Pavona varians* Verrill. Nat. size. Specimen from Salomon.
Fig. 4. *Pavona varians* Verrill. Nat. size. Specimen from Donganab.
Fig. 5. *Pavona gardineri* nov. spec. Nat. size.
Fig. 6. *Pavona gardineri* nov. spec. × 2.
Fig. 7. *Pavona clavus* Dana. × 2½.
Fig. 8. *Pavona diffluens* (Lamarck). × 2½.
Fig. 9. *Pavona explanulata* (Lamarck). × 2½.
Fig. 10. *Siderastrea savignyana* M. Edw. et H. Nat. size.

PLATE 32.

Fig. 1. *Leptoseris hawaiiensis* Vaughan. Slightly diminished in size.
Fig. 2. *Siderastrea savignyana* M. Edw. et H. (*S. lilacea* Klunzinger). Nat. size.
Fig. 3. *Leptoseris incrustans* (Quelch). Nat. size. Specimen from Saya de Malha.
Fig. 4. *Leptoseris incrustans* (Quelch). Nat. size. Specimen from Peros Banhos.
Fig. 5. *Coscinaræa ostreæformis* nov. spec. Upper side. × 2½.
Fig. 6. *Coscinaræa ostreæformis* nov. spec. Under side. × 2½.
Fig. 7. *Psammocora explanulata* nov. spec. × 2½.
Fig. 8. *Psammocora explanulata* nov. spec. Nat. size.



PAVONA, SIDERASTREA



LEPTOSERIS, SIDERASTREA, COSCINARÆA, PSAMMOCORA

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[Note.—Synonyms are printed in italics. A star is added to names which appear to be used for the first time. The authorities for genera and species are inserted only where mentioned in the text.]

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XIV.	Part I.	1910	1	18	0	1	8	6
	Part II.	1911	1	0	0	0	15	0
	Part III.	1911	1	8	0	1	1	0
	Part IV. Index	1912	0	5	0	0	3	9
XV.	Part I.	1912	1	9	0	1	1	9
	Part II.	1912	1	4	0	0	18	0
	Part III.	1912	1	6	0	0	19	6
	Part IV.	1913	0	12	0	0	9	0
XVI.	Part I.	1913	1	4	0	0	18	0
	Part II.	1913	1	1	0	0	15	9
	Part III.	1913	0	12	0	0	9	0
	Part IV.	1914	1	10	0	1	2	6
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